NeXTWORLD

FALL 1991

$4.95

Adobe's Best Illustrator Five Cube Rating



Photo Tour
A Peek Into the NeXT Labs



Bull Market
NeXT Arrives on Wall Street



New Sections
Community, News, How-To



SPECIAL REPORT

PLUNGING INTO COLOR

SIMSON00000652

NeXTWORLD
Fall 1991. Volume 1, Issue 3

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Welcome to Release 2.0 of NeXTWORLD. Thanks for your patience these last few months, but we've been busy changing a few things. If that sounds familiar to you, maybe it's because you remember the Apple 1, the Lisa, and the original Cube. Steve certainly does.

Each product was a breakthrough, but each also had a fatal flaw. The redeeming grace was that Steve followed them up with a truly hot successor. We think we've done that, too.

Here are some new things you'll find in the new *NeXTWORLD*: We start things off with a lively spread of lists, time lines, and quizzes, followed by a Community section focused on the interesting users, developers, and influencers in the NeXT world. A new How-To section in the back of the magazine is divided into segments aimed at readers with differing interests and levels of technical knowledge. Our reviews package has been enhanced with an irreverant column by John Perry Barlow and Dan Lavin, in which they trade subjective opinions of new products.

The features well is anchored by a cover package devoted to a single major theme. In this issue, the theme is color–color NeXT systems, color software, and color peripherals. And, yes, color *NeXTWORLD*. Just as NeXT thought carefully about how to implement color appropriately, our new design applies color photography, illustration, and text to boost communication and readability.

One other new element is *NeXTWORLD Extra*, a news section covering product and business developments, analysis, and rumors. *Extra* is bound into our quarterly magazine issues, and it will be sent to subscribers as a monthly stand-alone newsletter in the eight months a year that we don't publish a full issue.

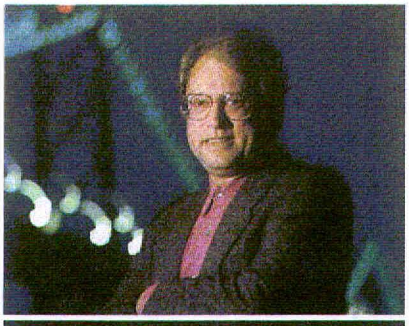
There are also some things that you probably won't find in the new *NeXTWORLD*. Articles about general technology futures and the social implications of computers are interesting, but you have other places to go for that. This is a magazine about NeXT computers and related products. Sorry, Toffler fans.

Finally, some things that were in *NeXTWORLD* before are still in it. Foremost among these is our fundamental belief that NeXT systems, software, and networking comprise the most exciting computer platform available today. But we will also retain the independence to speak our minds, whether or not NeXT or a third-party vendor may like what we have to say.

Underlying it all is our mission to inform, entertain, and challenge NeXT users and buyers with a magazine that reflects the creativity and excitement of the NeXT community.

★ ★ ★

That's enough on NeXTWORLD. What about NeXT? Like everyone else in the NeXT orbit, my enthusiasm for the computer is tempered by daily frustrations over products, services, and technologies that are still missing. Let's call this wish list the "Ten Most Wanted." Feel free to post it at your local post office or, better yet, your local NeXT dealer.



Ten Most Wanted

DAN RUBY

1 A professional-quality, page-oriented layout program. Ideally, it should be Quark XPress (what about it, Fred?), but here's an opportunity for somebody else to slip in first and dominate this crucial category. FrameMaker is great for what it is, but we need an application that really exploits the advantages of the NeXT environment.

2 A full-featured, programmable database front end. I'd have also included a simple flat-file database, but Andy Stone's DataPhile (when it ships) has that covered. What's really needed is an end-user development environment with a great interface and seamless connections to Sybase and Oracle.

3 Software for computer-aided design. AutoCAD is the standard, but I'd rather see something NeXT-specific. What's a professional workstation without a solution for the number-one professional-workstation application?

4 World-class 3D graphics and animation. That's what Steve's other company, Pixar, is all about, isn't it? How about putting Renderman alongside PostScript in the operating system? That would enable great third-party apps and make NeXT the platform of choice for professional graphics applications.

5 An upgrade path from the bottom of the NeXT line to the top. It's inexcusable that NeXTcube owners can't get 16-bit color. Base NeXTstations would be even more appealing if there were a way (external bus? expansion chassis?) to add color later.

6 A cheap color printer. If NeXT would follow the same strategy on a color printer as it did with the original laser (PostScript and processing in the computer), it could smash through the $5000 price barrier on color printing and sell a lot of NeXT boxes.

7 A NeXT marketing message that's as great as its technology message. The "professional workstation" moniker is promising, but I have my doubts about it as a unique selling proposition. NeXT's biggest distinguishing advantage right now is the ease and elegance of custom development with NeXTstep and Interface Builder. I think that's the way to get it in the door.

8 NeXTWORLD Expo. Well, the ball's in our court for this one. Stay tuned.

9 An on-line NeXT communication system accessible to business users. The Internet mail and news services are great if you can manage to get on them. That's easy if you're at an academic or government site, but NeXT is targeting the professional market. The community needs a link through which we can all share ideas and information. It should be plug-and-play, so that you're on the system simply by plugging into the phone jack.

10 Service and support second to none. One advantage of a relatively small user base is that it may be affordable to provide direct support. The nascent dealer channel is beginning to build its expertise, but NeXT could really help the community by opening up the phone lines.

It would be easy to go on, but better to let you pitch in with your own "Wanted" lists. Send them to me by U.S. or e-mail, and we'll publish the most interesting ones next issue. It's a good bet that NeXT is listening.

DAN RUBY *is the Editorial Director of* NeXTWORLD. *He can be reached at druby@nextworld.com.*

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About face

Don't get me wrong, I think Heidi and Alvin Toffler are interesting people [*NEXTWORLD*, April 1991]. However, when I subscribed to *NeXTWORLD* I was under the impression that your magazine would devote its resources to the technical aspects of the NeXT computer.

Did you run out of NeXT subject material?

I think you should take a hard look at the purpose and mission of your magazine.

DANIEL I. SHRAGER
Philadelphia, Pennsylvania

Welcome to the new NeXTWORLD. *See Dan Ruby's column for more on our new direction.–NW*

A sound comparison?

The idea that you can actually make music on the NeXT or in conjunction with the NeXT (e.g., downloading samples from supercomputers) without using MIDI or the DSP hasn't dawned on a lot of people. I just received the latest issue of *NeXTWORLD* and was dismayed that in an article comparing the Mac IIfx, the SPARCstation2, and the NeXT, you didn't bother to mention that 16-bit, CD-quality sound output (real time from disk under UNIX, no less) is standard on the NeXT. All it says in Table 1 is that "Dual RCA line-outs" are available.

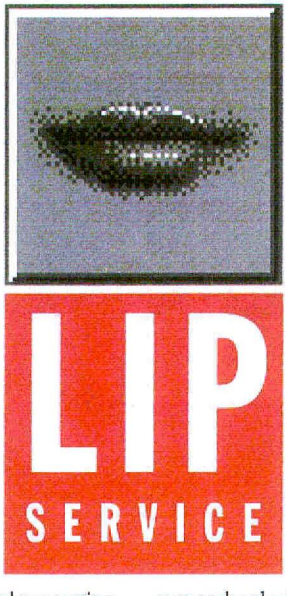
The implication is that the NeXT's sound is no better than the Mac or SPARC built-ins. In fact, the other two machines only have 8-bit output without expensive additional third-party components and software. Why don't people realize that this is a fantastic capability of the NeXT that other computers don't have without a lot of trouble?

I am also wondering about the benchmarks in Table 2. I heard that floating-point performance of the '040 was going to soar compared to the '030. The float benchmark given shows only a 46 percent improvement, a long way from the tenfold improvement I heard about last year. The text of the article makes no comment about this insipid result.

JIM BEAUCHAMP
Urbana, Illinois

Bruce Webster and Edward Jung reply: Thanks for pointing out the omission about NeXT's audio output. We would have liked to have discussed it–and a number of other topics–at greater length, but space was, unfortunately, limited.

The benchmark results show the dangers of both benchmarks and manufacturers' claims. We did our best to put in caveats about the bench marks; we can only hope that manufacturers would do the same.



Embed with the competition

Does NeXT have "embedded architecture?" [Black Box, April 1991]. Sorry, but I don't think so.

Try writing a word processing document. Add a couple of graphics and a couple of half-page spreadsheet cells. Now close the extraneous applications but leave open the word processor document. Double-click on a graphic or a spreadsheet cell. Does this launch the requisite applicaton? No, it does not.

Try e-mailing the document to a colleague who doesn't have the same word processing, drawing/painting, and spreadsheet applications. When the colleague double-clicks on the document, does a panel pop up asking how the document should be translated? No, it does not.

When NeXT is able to do these tasks, then, and only then, can we say that NeXT supports embedded architecture. Only then can NeXT stop simply being a faster, more expensive Macintosh and start being a better PC.

A. DJOJONEGORO
Houston, Texas

You don't happen to work for Microsoft, do you?–NW

Standard bearer

In NeXT Ink [*NeXTWORLD*, January 1991], Dan Lavin wrote that a strong marketing strategy and wide customer acceptance are major factors in the success of a new computer platform. I'd like point out two other factors: standards and trends.

You cannot force new concepts just because they're better. You need to listen to the customers and to the market, and to companies that have already spent large amounts of money and will want to protect their investments before buying into new technologies. NeXT did implement certain standards like TCP/IP and NFS. However, I wonder if the market will see the PostScript display or NeXTstep as advantages if, for instance, X-Windows or the X.400 mailing protocol can't be implemented properly on them.

As a computer analyst I really like what I read about the NeXT, and I feel it has every ingredient to become a killer. On the other hand, I fear the NeXT could turn out to be some kind of cult machine for computer-fanciers.

BRUNO GERMAIN
IS analyst, Xerox Canada
Montreal, Quebec, Canada

Subscriptions

Concerning my subscription, I sent a free issue card last fall. I have since acquired a NeXTstation, and NeXT is offering a free subscription to your magazine. I have been billed. I assumed that the issue I received was due to the card I sent. Could you sort this out for me?

SYLVAIN LEVESQUE
Cambridge, Massachusetts

Our subscription policy has caused quite a bit of confusion, for which we apologize. We hope this explanation will help.

NeXTWORLD *offered a charter subscription of a free premiere issue and six additional issues. At the same time, through an arrangement with* NeXTWORLD, *NeXT Computer was offering a "free subscription" (six issues) to the magazine as part of its RSVP program, for people who bought a new machine or system upgrade. People who subscribed to* NeXTWORLD *and then bought the new machines have a double subscription: that is, 13 issues of* NeXTWORLD.

Now that NeXTWORLD *is publishing quarterly, a six-issue subscription lasts for more than a year. You'll still receive six issues, along with a monthly newsletter covering NeXT business and product news.*

To add to the confusion, we misprinted the subscription-services number in our masthead in the first two issues. The correct number is 800/755-6398. If you still have questions about your subscriptions, please call that number. –NW

***NeXTWORLD* welcomes your gripes and suggestions. Please send them to Letters at *NeXTWORLD*, 501 Second Street, San Francisco, CA 94107, or e-mail letters@nextworld.com.**

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What's NeXT™ from Microtech.



The only other name you need to know.

In 1984, Steve Jobs had a vision that would revolutionize personal computing, and Microtech International became the leader in this Macintosh revolution by developing outstanding upgrade solutions.

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Introducing the Microtech line of NeXT upgrade solutions. Enhance your NeXT computer with our new Eclipse™ Series external drives of 120MB to 1GB. With limited resident space after system installation, Eclipse offers you superior mass storage solutions and an exciting, sleek design that will compliment your NeXTstation™ or NeXTcube™.

Our SIMM expansion boards give your NeXT computer the boost it needs for intensive applications and allow for dozens of economical storage and memory options.

Microtech offers the only tape backup for the NeXT platform. Utilizing new DAT technology, our backup drive offers over 1GB of archival storage. And our new CD-ROM drive features power, speed and stunning good looks.

Take the next step.

As the NeXT revolution gains momentum, Microtech International continues its tradition of quality products backed by the longest warranties in the industry. Microtech's nationally recognized service and support team is second to none. We have an outstanding record for repairs in 48 hours or less, and our MicroLink BBS is available 24 hours a day.

So for products you can depend on and service you can rely on, there really is only one other name you need to know... Microtech International.

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MICROTECH INTERNATIONAL, INC.

Circle 2 on reader service card

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QUIZ

CODE NAMES

During the development of new products, team members use code names to maintain secrecy around the project. Can you match the code name to the final shipping product?

A. Warp 9
B. BLT
C. Back Bay
D. NeXTdimension
E. Detente
F. Gaul
G. X-15

1. **PowerStep**
2. **NeXTstation**
3. **NeXTdimension**
4. **Improv**
5. **NeXTcube**
6. **SoftPC**
7. **Diagram!**

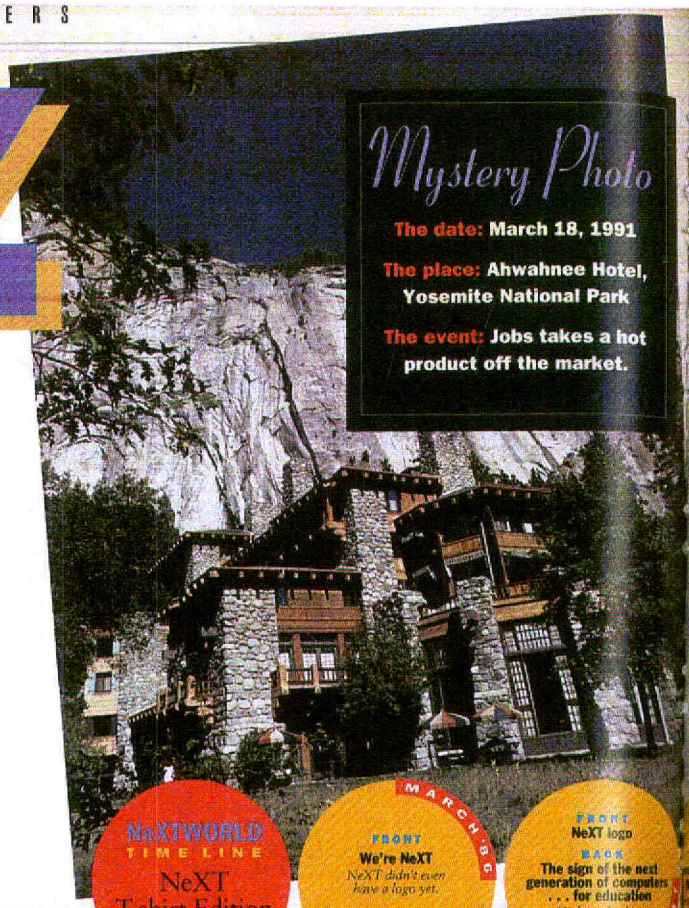
ANSWERS AT BOTTOM RIGHT

Mystery Photo

The date: March 18, 1991

The place: Ahwahnee Hotel, Yosemite National Park

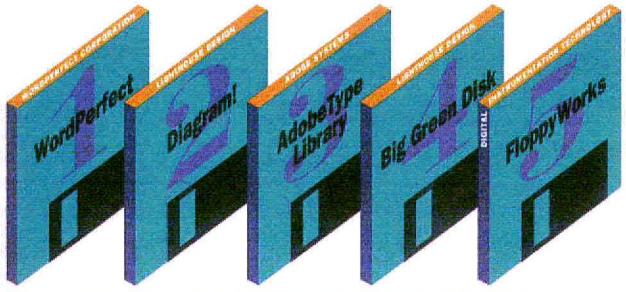
The event: Jobs takes a hot product off the market.



NeXTWORLD TIME LINE
NeXT T-shirt Edition

MARCH '89
FRONT
We're NeXT
NeXT didn't even have a logo yet.

FRONT
NeXT logo
BACK
The sign of the next generation of computers . . . for education
Higher ed is king at NeXT.



These are the hottest-selling NeXT products as of press time, according to NeXTConnection, a mail-order

Best-Sellers

distribution source for NeXT products. Note that NeXTConnection handles most, but not all, NeXT software.



STREET PRICES

HARDWARE	BEST PRICE	WHERE
NeXTstation Color (105MB hard drive, 12MB RAM)	$7895	NeXT or any dealer
NeXTdimension board (8MB RAM)	$3995	NeXT or any dealer
1MB SIMMS	$39.20	Memory International 714/588-0488
4MB SIMMS	$155	Chip Merchant 800/426-6375
1.4MB floppies	$11.99/10	Fry's Electronics 408/733-1770
2.88MB floppies	$72.95/10	Fry's Electronics 408/733-1770
660MB hard disk	$1398	Fast Access 708/530-7749
1.2GB hard disk	$2198	Fast Access 708/530-7749

THESE ARE THE BEST PRICES WE COULD FIND, AS OF PRESS TIME, ON IN-DEMAND NEXT PRODUCTS. WE GOT LEADS ON THE HARDWARE PRICES OFF THE COMP.SYS.NEXT INTERNET NEWSGROUP. CALL THE NAMED DISTRIBUTOR TO ORDER. THE SOFTWARE PRICES COME FROM A SAMPLING OF MAIN DISTRIBUTORS. YOU SHOULD BE ABLE TO MATCH THE PRICE WITH A LITTLE SHOPPING.

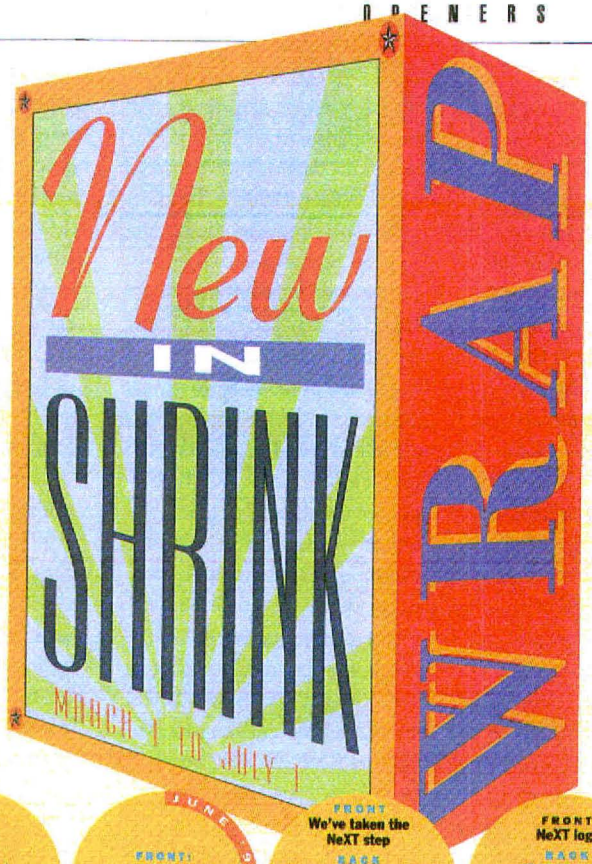
SOFTWARE	LIST	STREET
WordPerfect 1.0.1 (WordPerfect)	$499	$329
Diagram! 2.0 (Lighthouse Design)	$399	$295
Adobe Plus Pack (Adobe Systems)	$495	$199
Digital Ears 1.0 (Metaresearch)	$650	$519
TextArt 1.0 (Stone Design)	$350	$319
Improv 1.0 (Lotus Development)	$695	$549

STREET PRICES

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Out of the vapor

It was a banner quarter for third-party applications. With availability of Insignia's SoftPC and WordPerfect's NeXT version, no one could dismiss NeXT's viability in business. Adobe Illustrator and FrameMaker 2.0D bolstered NeXT's publishing story. And Boss Logic's BDMS and HSD's OCR Servant gave NeXT two more unique advantages. The most prominent product still in vapor: Software Ventures' Microphone II.



Developer's Tools

Hex Editor
Scheiber Consulting
Side-by-side editing
$50

PaperSight OCR Tool
Visual Understanding Systems (VISUS)
Optical character recognition
For price, contact VISUS

DTP/Graphics

Adobe Illustrator/ Separator 3.0
Adobe Systems
Graphic design and illustration
$695

FrameMaker 2.0D
Frame Technology Corportion
Complete workstation publishing
$995

Peripherals

Scan-X Color
HSD Miocrocomputer
24-bit desktop scanner
$2995

Business

Boss Document Management System (BDMS)
Boss Logic
Work flow and multimedia document system
For price, contact Boss Logic

Contact!
Boss Logic
Contact information database
For price, contact Boss Logic

OCR Servant
HSD Microcomputer
Optical character recognition
$295

SoftPC 2.0
Insignia Solutions
PC/AT emulator
$499

WordPerfect 1.0.1
WordPerfect Corporation
Full-featured word processor
$495

Scientific

Mathematica 2.0
Wolfram Research
Mathematical computation and programming
$1495 (bundled with higher education software)

Connectivity/ Communications

Asante EN/SC
Asante Technologies
SCSI-to-Ethernet connectivity
$499

Coconut Host
Coconut Computing
Multiuser graphical bulletin board
Price starts at $395 for two users

CocoTalk API C Library
Coconut Computing, Inc.
Graphics functions
$395

co-Xist
Pencom Software
X windows X11R4 server
$249

Marble Teleconnect
Marble Associates
Commercial-grade SLIP
$295

Versalink
Morning Star Technologies
Communications adapter with X.25
$2495

Database

Objective DB Toolkit
Professional Software
Database object library
$995

Multimedia

HyperCube
Thoughtful Software
Hypermedia development
$495

SoundWorks
Metaresearch
Sound recording and editing
$395

Entertainment

Culture Shock
Athena Design
Strategy game
$24.95

For information on these products, contact your NeXT product dealer. Manufacturers: If you have a product shipping for the NeXT, please write us a *NeXTWORLD*, New Products, 501 Second St., San Francisco, CA 94107, fax us at 415/978-3196, or send e-mail to newprod@nextworld.com

Overheard

"The (Improv) engine can handle 16 dimensions, but the user interface can handle only 12. It's mathematically proven that any complex concept in the universe can be represented in 12 dimensions."

PAUL S. KLEPPNER, PRINCIPAL ENGINEER, IMPROV DEVELOPMENT CORPORATION, IMPROV DEVELOPMENT TEAM, WHEN ASKED ABOUT IMPROV'S LIMITATION OF 12 DIMENSIONS.

PRESS CLIPS

NeXT ships 8000 units in Q1

It's taken a few years, but Steve Jobs thinks that he has finally figured out how to define his sleek but slow-selling NeXT computer: It's a "professional workstation." . . . Conveniently, this niche is small enough for NeXT to be a major player yet is growing fast enough to be worthwhile.
—*Jonathan Weber, Los Angeles Times, April 15, 1991*

With his NeXT machine lagging badly in the computer workstation market, Jobs last week called a gathering of reporters to announce the existence of a hitherto unknown market in which his company was (surprise!) No. 2.
—*Bits & Bytes, San Jose Mercury News, April 10, 1991*

The handful of commercial buyers who have already bought NeXT machines say they're impressed. . . . "You can't put a box on someone's desk that they'll like more than the NeXT," says Hadar Pedhazur, equities technology manger at UBS Securities Inc., which owns 14 NeXT workstations. Now, all the newlywed Jobs has to do is court several thousand more corporate sweethearts.
—*Barbara Buell, Business Week, April 15, 1991*

Perhaps too much was expected of Steve Jobs. "There are a lot of people who do one incredible great thing and then we never hear from them again," says Apple's [Deborah] Coleman. "J. D. Salinger wrote *Catcher in the Rye*, but what else has he done?"
—*Julie Pitta, Forbes, April 29, 1991*

Maybe NeXT is just filling the pipeline. . . That would mean that the sales will fall off and NeXT will go back to being the failure everybody thinks it is. I don't think that's true. I think Jobs has got his third winner. . . . And I can see how the company's momentum will continue to build and launch it into the ranks of first-tier computer companies.
—*Stewart Alsop, InfoWorld, April 8, 1991*



Accelerating Innovation

What happens when you put NeXT development tools in the hands of self-described "Fortran slobs" at a high-energy physics lab? "Accidental innovation," says Paul Kunz, a physicist at the Stanford Linear Accelerator Center (SLAC) in Menlo Park, California.



Paul Kunz at SLAC *develops interactive interfaces for physics.*

"It's so easy to try out your wildest ideas that you do it, and some of them work. If it would take two weeks to implement an idea, you'd never try it. But two days, that's easy," Kunz says.

Kunz's wild idea was to apply a visual, interactive interface to statistical analysis of the behavior of elementary particles at SLAC, one of the world's premier sites for high-energy physics. Kunz and his colleague, William Atwood, installed two NeXTcubes in June 1989. Two weeks later, they had their first "toy project" up and running, and by the end of the summer, the basic pieces of their Reason program were functional.

By mid-1990, they had completed three sophisticated analytical programs. Today, 24 NeXT machines are employed in Kunz's lab for dozens of applications, ranging from basic research to general productivity.

Kunz and Atwood settled on the NeXT environment because it combined standard UNIX networking and development tools with a graphical user interface on a high-performance platform. All that was missing was a Fortran compiler, a gaping hole in a research field that is traditionally based on Fortran.

Most computing work at SLAC and other accelerator centers around the world is done with Fortran running on DEC or IBM mainframes. Therefore, Kunz and his colleagues had virtually no experience with UNIX or object-oriented programming. "We were just a bunch of Fortran slobs, but we know how to do analysis. We just applied it to the NeXT graphical environment."

Reason is a statistical program for analyzing the characteristics of elementary particles in a particle accelerator. It produces histograms that show the distribution of particles according to user-selected parameters, but it does so in a highly interactive format.

With Reason, the user specifies the analysis criteria by building a visual program from a palette of objects. The user can zoom in on the histogram to see the fine structure of the data or can change the scale by using a slider. Changing the display does not require rerunning the calculation, so the program provides almost instant feedback, letting the user explore the data interactively.

The use of the slider to change the histogram scale was an example of accidental invention, Kunz says. "It was just an idea that came up in the course of a long-winded discussion," but when implemented a few days later, it turned out to be a major improvement in the program.

Another program Kunz's colleagues developed is a version of a standard minimization program that fits the histograms generated in Reason to statistical functions. Each parameter of the function can be connected to a slider, enabling the user to manually redraw the curve to examine the extent to which the function depends on that particular parameter. The curve actually changes on the display as the slider is moved.

While Kunz's interface to the program is new, the computational kernel is a 20-year-old physics analysis tool comprising 7000 lines of Fortran. Revitalizing old programs is one of the key benefits of Interface Builder, Kunz believes. "There are hundreds of thousands of programs out there that have nothing wrong with them except their user interface."

If Kunz's experience is at all typical, reclaiming old programs or building new ones is not a daunting task. Kunz attended a NeXT developer camp, but he felt out of place and ultimately didn't need much help from NeXT. "We just struggled along and achieved great results on our own," he says.

Mother of Invention

Everyone at NeXT knows Bambi. Although her official job is providing administrative- and project-management support to the company's eight advocates, Bambi Fernandez acknowledges that she's best known as NeXT's "corporate mom."

"NeXT is a company run by bright, busy kids," says Bambi, "and it's my job to look after some of them." She developed her special talent for fostering creative young people while raising four boys of her own. It was her eldest, Bill Fernandez, who earned an important place in Silicon Valley's history by introducing the "Two Steves"–Jobs and Wozniak–to one another. Together, the Steves founded Apple Computer, and Bill Fernandez became the company's first employee.

"When Bill was 13 years old, he and Steven (Jobs) were in the right place at the right time," says Bambi of the computer course the two youngsters attended together at Homestead High School, in Sunnyvale, California.

"That's what got them started," she says, recalling the escapades of the precocious youths. "They'd raid garbage cans for discarded electronic parts, then spread them out all over the living room floor."



Bambi Fernandez:

"With Interface Builder and NeXTstep's object-oriented programming, the drudgery is done for you. It lets you keep your mind on the problem at hand."

Kunz is so enthralled with the capabilities of Interface Builder that he wonders why NeXT is not marketing it more aggressively.

"Interface Builder is NeXT's true advantage. The difference is that you go to work with the attitude, 'What fun can I have today?' With other programming environments, it's, 'How long is it going to take to finish this task?'"

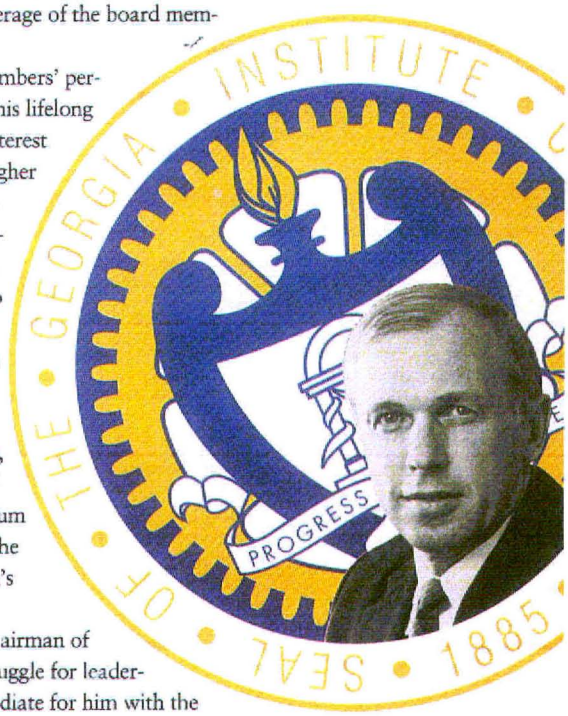
"If you put this tool in the hands of people who know their own business, as opposed to the business of programming, that's when you get real innovation," he says.

by DAN RUBY

Odd Man In

John "Pat" Crecine, president of Georgia Tech, jokes that he was chosen as the third member of NeXT's board of directors—joining billionaire technologist H. Ross Perot and multimillionaire company founder Steve Jobs—"to lower the average of the board members' personal net worth."

Besides raising the average of the board members' personal sense of humor, Crecine also contributes his lifelong involvement with computing and—of special interest to NeXT's original target market—its role in higher education. Calling himself an "aggressive user" since high school, Crecine described a paper he wrote about computers in 1957, which included a machine-language program he developed solely from reading manuals. He was able to actually implement the program two years later, as a student operating the mainframe at Carnegie Tech's business school from 2 a.m. to 4 a.m. on Sunday mornings.



Georgia Tech president Pat Crecine *brings an education outlook to NeXT's board of directors.*

Returning years later to what became Carnegie Mellon University, as senior vice president of academic affairs, Crecine inaugurated the country's first graduate school of computer science and headed the Interuniversity Consortium for Educational Computing—which, interestingly, chose the UNIX operating system as the answer to higher education's computing problems.

Involvement in the consortium led Steve Jobs, then chairman of Apple Computer, to get to know Crecine. Later, in the struggle for leadership at Apple, Jobs called on Crecine for advice and to mediate for him with the company.

As a member of the NeXT board, Crecine has had the opportunity to admire Jobs' intensity, aggressiveness, and attention to detail—"which ultimately translate into quality of product"—while, for example, spending three to four hours standing around prototypes of the NeXT cube debating what shade of black it should be.

"American industry would do well to emphasize attention to detail and attention to both the aesthetics and functionality of design–the way Steve does," says Crecine. "There is no reason things have to be ugly to be functional."

As for the platform Crecine refers to as the "workstation for the masses," he believes that "the ability to do rapid prototyping of database applications is really going to be the key to NeXT's success in the corporate market." He feels that the NeXT's breakthrough is in "suggesting what a very simple multimedia device can be. What we need now is the equivalent of PostScript for multimedia.

"The ideas that are in the NeXT machine will be embedded in whatever the leading platform of the '90s will be, whether that is NeXT or something from somebody who has been smart enough to see the importance of these ideas and implement them in some other way."

At Georgia Tech for the past four years, Crecine has continued his educational innovations, creating the country's first college of computing. And he has been heavily involved in Atlanta's successful drive to host the Olympic Games in 1996. An innovation dreamed up by Crecine for the bid, and implemented by Georgia Tech researchers, is a 3-D computer model of the city, enabling viewers to select and fly through its hotels, athletic venues, and other landmarks. Crecine also continues to keep his fingers on the programming keys, currently using his NeXT to create a graphics front end to an urban spatial-location model.

In his increasingly spare spare time, the poorest NeXT board member also continues another pleasure from high school days–fast-pitch softball pitching. He employs an intimidating side-arm-like underhand delivery that once reached 80 to 85 miles per hour, "but now is only in the high 60s, on a good day. Now I really need to go after the corners, I've got to finesse it"–which is what many say he is doing off the field as well.

by STUART SILVERSTONE

At NeXT, her mothering extends to a larger family. On any given day, she tends to an average of 50 e-mail messages and phone or in-person queries, and manages requests for information or support from her team members and other company executives. "I'm usually working on three things at once. I'm grateful that my NeXTcube is inherently multitasking–" she says with a gusty phew, then adds, "–like me."

"Bambi's the ultimate team player," says Scott Love, NeXT advocate. "Whether it's jumper cables or a hard-to-get phone number–or just for a reach into the big candy jar she keeps stocked with sweets–Bambi always gives you what you need." Does that include scoldings for late expense reports, as well? "She's never come after me with a stick . . . yet."

by JOE HUTSKO

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Brick by Brick

Building software is very much like designing buildings, says Andrew Stone. "The intricate wiring and plumbing must be interconnected seamlessly. It doesn't really matter whether you're using bricks or object modules."

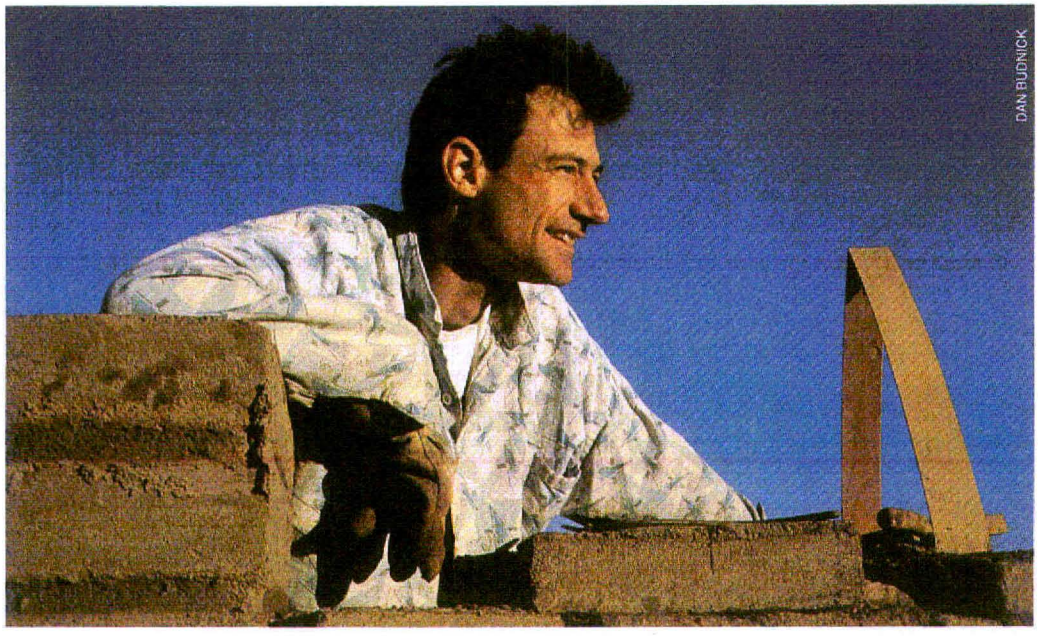
Stone and partner Kris Jensen are the heart of Stone Design, a NeXT software developer in Albuquerque, New Mexico. Stone Design has already brought out a text-styling program named TextArt and will soon release two more packages: a graphics application called Create! and DataPhile, a flat-file database manager.

"I've always been big on tools," says Stone. Pursuing that interest, he studied architecture at the University of New Mexico (UNM) in the 1970s. Eager to be self-reliant, he also studied industrial arts, including welding, woodworking, and metalworking. After picking up an architecture degree, he started a company to design and build custom homes that are heated and cooled totally by solar energy. Stone's work with computers evolved out of this first career.

In 1980, Stone bought a Tandy TRS-80 microcomputer to help him do cost estimates for his business. By 1984, he had moved to a PC but still used it only for estimates. Not until he bought an Apple Macintosh, in 1985, did he finally warm to computers. He began producing floor plans with MacDraw.

"As the Mac revolution took off, I was very involved in my local user group," Stone says. "The Mac loosened me up and got me involved in programming. I just got to a point in life where I thought this was more fun than what I'd been doing."

Kris Jensen used to be a labor lawyer in California. She started computing with programmable calculators and an Apple II in 1980. "Soon I was rushing home from work every night to throw myself in front of the computer," she recalls. Classes in BASIC, Pascal, C, HyperTalk, and Objective C followed. She became involved with the Macintosh and served as president of the Mac user group in Albuquerque. In addition to being a partner in Stone Design, Jensen is currently working on a doctorate in computer science at the UNM, doing research on user-interface design.



Stone Design's Andrew Stone: *Using software building blocks.*

The NeXT endeavor began two years ago, when Stone and Jensen attended a NeXT demonstration. "After the show, they took us out to dinner," Stone recalls, "and the first thing we said was, 'How do we get one of these machines?!'" Because the educational option was out–UNM hadn't set up any deal with NeXT– the NeXT representatives told Stone and Jensen that they would have to become developers. So they did.

Stone Design's first product was TextArt, a drawing package and publishing tool that allows users to manipulate and execute complicated effects on text simply by clicking buttons and dragging sliders. Stone revels in the NeXT's Display PostScript but admits that TextArt had its genesis in his frustration with the language: he was a PostScript hacker who couldn't type. As a result, he decided "to parameterize all of PostScript such that you just have knobs, dials, and wheels for the commands" instead of using a keyboard.

TextArt allows users to style text into circles, arcs, or roses, add shadows, or skew letters. An intuitive interface makes it easy to transform Adobe fonts into display type. Professional publishers use it to create headlines and packaging logos; amateurs create letterheads and party invitations. TextArt files can handle Encapsulated PostScript (EPS) and TIFF graphics as well.

Stone says that as he refined TextArt, he "found a new program emerging–one that could handle not only PostScript text but graphics as well." Create!, a superset of TextArt with graphics, capitalizes on color.

The third product in Stone Design's quiver is DataPhile, a flat-file database manager. The program was prompted both by suggestions from NeXT and, once again, by necessity in Stone's own business. The goal was a database manager that "somebody familiar with flat-file database concepts and the NeXT could use immediately without reading anything," explains Jensen, who created the structure and internal workings of DataPhile. Stone, who is working on the interface for DataPhile, points to its ability to handle not just conventional types of data (text, date, numeric, and monetary) but pictures and sound as well.

Stone and Jensen have agreed that after DataPhile ships, they will concentrate on getting back to the original proposal they made to NeXT to obtain developer status: "To make Acme Gizmos, hundreds of really powerful objects we've developed." Such a collection of objects, or "gizmos," would be a tool kit for programmers. Stone Design will create "the right model and glue for people to easily put together" pre-built and tested software elements to plug in and create their own programs.

by PHILIP ROBINSON

Field Reports

Threads From the Net

Confusion reigns over monitor policy, and this has spilled over into the news group. If you're seeking an alternative to the standard NeXT 17-inch color monitor, the old Sony 16-inch monitor reportedly works with an RGB adaptor, or you can choose your own (be sure to get a pixel clock rate of at least 100MHz, vertical scan rate of 68Hz or more [non-interlaced], and most importantly, a horizontal scan rate of about 61KHz or better). NeXT MegaPixel Displays have now aged and defocused significantly (an indication of NeXT's maturity); some posters focus them at home, but a call to authorized service is NeXT's suggested course of action.

★

As more and more new applications begin to ship on the new 2.88MB floppy format, old Cube owners are left with only the unsavory option of purchasing a $500 external floppy disk drive. Especially painful is the plight of new 68040 upgrade purchasers, who have the connector for the new internal floppy drive right on their new board but no possible means of buying one (Sony will not sell to individuals). One impassioned poster said, "I know at least five other Cube owners who would be willing to [buy one]. PLEASE sell us the internal floppy drive!!!!" Another quickly replied, "Make that six."

With prices of $9 per 2.88MB disk from NeXT Connection, and about $7 from NeXT, for developers, many posters wondered who would enter this brave new world when 1.44 MB disks are only 75 cents.

★

In the archives: Real games (e.g., BoinkOut, BlastApp) began to appear on a regular basis, a good sign that the NeXT is becoming a more personal computer; NeXT submitted many new articles, Q&A sections, and manuals not provided with the system (hopefully an ongoing process); and many new developers are distributing demo versions of their apps in the archives as well (a telephone call and credit card can fully enable a demo copy).

The archives of public software on the net continue to grow. Some users at MIT have put together a list of Frequently Asked Questions (FAQs) that is separate from NeXTAnswers. Carlos Salinas of Cal Tech reports that it is packed with useful information. Available at your favorite archive site. NewsGrazer, a simple but useful NeXT front-end for news-reading written by NeXT employee Jayson Adams, demonstrates NeXT's continuing presence on the net. E-mail a message with the Subject help to archive-server@nova.cc.purdue.edu for more information about the archives.

★

Readers were happy to see new alarm chips in the NeXTstation Color, which allow the machine to automatically power on and off at given times and to reboot after power failures. Readers also hope they'll spread to the other machines.

★

Lots of people have complained about the modem-cabling problem on the NeXT. Thanks to the advocacy of Marble Associates, Altex Electronics (800/531-5369) will now ship correctly wired black modem cables for the NeXT 68030 or 68040 (ask for them by machine name) for $8.95. Mac and other modem cables are not wired properly but may work for the simplest devices.

★

There has been a lot of discussion about subscription problems with *NeXTWORLD* magazine. In the words of Dr. Barry Merriman at UCLA, "I wonder if this discussion will make it into *NeXTWORLD's* "comp.sys.next" column, which features the hot topics on this newsgroup :-)." Well, it did. The complaints in the newsgroup have had a significant effect on the way our credit and circulation departments do business. For a full reply, see our response on the net.

★

Readership of comp.sys.next has been skyrocketing in the past few months. By early March, an estimated 46,000 people (3.9% of all netnews readers) were participating.

User Group News

The user group e-mail alias list put together by Conrad Geiger has proved to be a very effective communication path for the user group community. Messages go immediately to almost all user groups and then ripple to individual members through automatic forwarding. You can contact Geiger at user_groups@next.com to be added to this list or to send messages to this list. Other new electronic mailing lists have sprung up over time and are now quite busy. Among them are: nug (NeXT User Group discussion), next-prog (programmers), next-lab (groups of NeXTs), and next-managers.

★

The user group community has now grown to 123 groups in 35 states and 10 foreign countries. Some new groups in Europe include Italy and the United Kingdom. Corporate groups include AT&T and Motorola. Total membership now tops 7000.

★

There is a new NeXT SIG on Portal. Roger McBride is the moderator. You can reach him at rmcbride@cup.portal.com

Compiled by DAN LAVIN AND CHARLES L. PERKINS

NeXT Events

JULY–OCTOBER 1991

TRADE SHOWS

NeXT will exhibit or Steve Jobs will speak at these shows.

September 23. Agenda 91 (Stewart Alsop's annual industry gathering), Laguna Niguel, California. 415/592-8880

October 1–3. Seybold Conference San Jose, California. 213/457-5850

October 16. German Computer Science Society, Darmstadt, Germany. 49-6151-155-199 fax

October 16–19. EDUCOM (largest annual conference on computers in education), San Diego, California. 202/872-4200

October 21–25. COMDEX Las Vegas, Nevada. 800/325-8850

October 30–November 1. UnixExpo New York, New York. 212/391-9111

USER GROUP MEETINGS

Over 100 NeXT user groups exist around the world. This list includes meeting times for the largest ones. For the name of the group nearest you, call 415/848-NEXT or e-mail usergroups@next.com.

BANG, Bay Area NeXT User Group
415/327-BANG
July 17, August 21, September 18, October 23. Meetings are in Terman Auditorium, Stanford University, at 7 p.m.

The Boston Computer Society NeXT User's Group
617/252-0600
July 2, August 6, September 3, October 1. Meetings are in Room 1-130, MIT.

DaNG, Dallas-Ft. Worth NeXT Group
214/830-2472
July 31, August 28, September 25, October 30. Meetings are at the Bozell Advertising Agency, 210 East Carpenter Frwy., Irving, Texas 75062, at 7 p.m.

rmNUG, Rocky Mountain NeXT User Group, Denver, Colorado
303/492-2545
July 10, August 14, September 11. Call for meeting locations.

WANUG, Washington NeXT User Group, Washington, D.C.
703/742-0470
July 3, August 7, September 4, October 2. Meetings are at the MITRE Corporation, McLean, Virginia, at 7 p.m.

If you have information about upcoming events of interest to the NeXT community, send an announcement to NeXT Events, NeXTWORLD, 501 Second St., San Francisco, CA 94107, or e-mail events@nextworld.com.

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NEXTWORLD EXTRA
AUGUST 1991

NEWS IN BRIEF

Lotus Development announced that its Improv Application Programming Interface toolkit shipped during May and that several developers are using it to release the first Improv add-ons. Objective Technologies is in alpha release with OTProvide, a data-base link and SQL query manager; Marble Associates planned an early-July ship for Marble Teleconnect, a decision-support product; and Atlas Consulting Services is beta-testing Atlasphere, a customized time and billing system for the legal profession. Registered Improv users and NeXT developers can receive the toolkit free by calling 800/345-1043.

WordPerfect owners who bought the product before April may not know that a new version without most of the bugs found in the January release is now shipping. Following its common practice of in-line upgrades, WordPerfect made no announcement of version 1.0.1. While registered owners can upgrade for free by calling 801/228-9910, they were not notified that the upgrade was available. According to WordPerfect, only 20 percent of the current installed base were shipped the original version, and most have since upgraded.

CompuServe Information Service (CIS) launched an on-line forum focused on the NeXT computer. The new service will give access to NeXT message threads, program libraries, and live conferences to CompuServe's more than 600,000 subscribers. Call 800/848-8199, ext. 235, for information. Current CIS subscribers can access the forum by typing "go nextforum."

RenderMan Toolkit, a system that creates synthetic computer images that are virtually indistinguishable from photographs, is now shipping for the NeXT computer. It is priced at $2500.

The program is run from the UNIX command line, accepts input files in Pixar's standard RenderMan Interface Bytestream (RIB) format, [CONTINUED ON PAGE 15]

NetWare and AppleShare support to fulfill promise of mixed networks

Free floppy upgrade will provide transparent access to PC and Mac files

by ERIC ADAMS

Redwood City, CA – NeXT will offer transparent access to files on NetWare and AppleShare networks, possibly as early as this fall, according to Kevin Wells, a NeXT software product manager. The client software will be bundled with NeXT's operating system at no additional charge.

"Basically [the software] will allow users to see Novell and AppleShare file servers in the Browser," said Wells. Support for AppleShare and NetWare printers will also be included with the software or follow shortly, he added. The native-mode implementation obviates the need for network administrators to outfit each client with a NetWare Loadable Module to support NetWare.

NeXT hasn't determined how the software will be made available to current users. "If it works on top of 2.0 and we can make it work with an add-on disk, then we'll probably try to make a product like that available," said Wells.

Historically, NeXT has not made a profit on system software upgrades. "We've only charged for the cost of media and licensing," Wells said.

Wells wouldn't say when the client software would be released, but at an April 5 press conference, Steve Jobs said that "full Novell client and Apple EtherTalk support" would be available this fall.

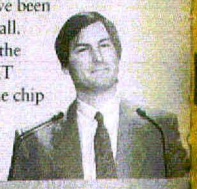
"Having a NetWare interface available to the client obviously makes more sense than having just NFS," said David Kosiur, editor of *Connections Journal*, a Macintosh network journal published in Fullerton, California. NFS is Sun Microsystems' Network File System, which is included with the NeXT and requires a TCP/IP network. [CONTINUED ON PAGE 15]

C-Cube ships JPEG, but too late for ND

by DAN LAVIN

Los Angeles – C-Cube Microsystems announced at the Digital World conference that it has finally shipped its JPEG (Joint Photographic Experts Group) compression chip, but the shipment came too late for NeXT.

The C-Cube chip was originally to have been ready last fall. Because of the delay, NeXT removed the chip from the NeXTdimension video board, which shipped to customers in May. JPEG capability would have enabled NeXTdimension to capture full-motion video to disk.



At Digital World, Steve Jobs called for a joint effort to develop "a CD player on steroids."

"C-Cube blew it," said Steve Jobs, NeXT's Chief Executive Officer, in a speech at Digital World. Jobs also endorsed the MPEG [CONTINUED ON PAGE 15]

Microphone narrows telecom gap

by DAN LAVIN

Berkeley, CA – NeXT's gap in general-purpose telecommunications software narrowed last month when Software Ventures shipped beta copies of Microphone II. Originally scheduled for release in the first quarter of 1991, the program is now headed for a general release in the fall, according to the company.

Microphone II combines terminal emulation, scripting, and user-interface tools. Versions of the software are available for the Macintosh, Windows, and DOS, but the NeXT product is more than a simple port, said David Hindawi, president of Software Ventures.

The user-interface tools are completely customized for the NeXT. Microphone will ship with a palette of objects that are used directly with Interface Builder to create completely NeXT-compliant user interfaces.

"It will be the most sophisticated version of Microphone that we offer," Hindawi said.

He explained that Microphone could be a complete communications center for a NeXT user, acting as a front end for remote information services, remote mail servers, electronic bulletin board services, and local and remote databases. Microphone will support all major protocols to communicate with a full range of remote hosts. Scripting tools provide a complete programming language for automating the connection to these hosts.

Software Ventures has seen significant international interest in the product already. "There is no satisfactory product for communications in the NeXT marketplace right now," said Sylvia Paull, director of marketing.



Microphone II lets you create a custom, icon-based command center for connections to on-line services.

Microphone II for the NeXT will cost $395. Software Ventures, 2907 Claremont Ave., Berkeley, CA 94705. 415/644-3232.

NeXT offers direct support to users and dealers with NeXTedge service program

by LAURA FREDRICKSON

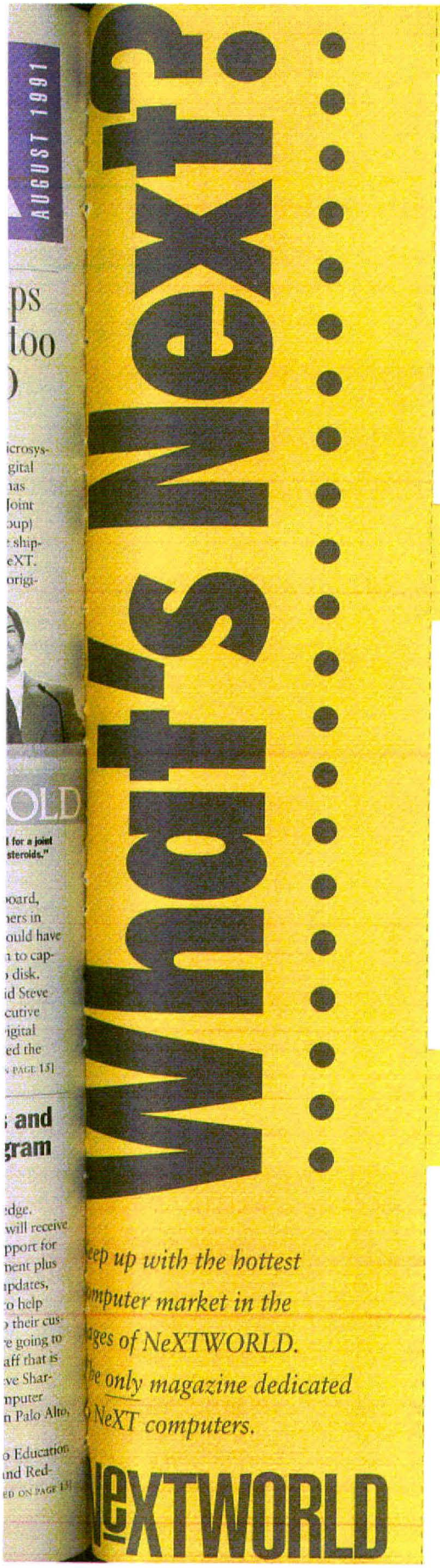
Redwood City, CA – For the first time, NeXT users can get on-site service, software support, and training directly from NeXT. The company has consolidated all of its hardware service, software support, and training under its new NeXTedge program, with services offered to users and resellers.

"We have an obligation to empower resellers to provide the same quality of product that customers would get directly from NeXT. The challenge is to ensure that customers get uniformity of service and support," said Paul Vais, director of NeXTedge.

Dealers and resellers will receive training, service, and support for their own NeXT equipment plus technical information, updates, and product templates to help them provide services to their customers. "We think we're going to benefit with a service staff that is better trained," said Steve Sharbach, a manager at Computer Attic, a NeXT reseller in Palo Alto, California.

NeXT has set up two Education Centers, in Pittsburgh and Redwood City, [CONTINUED ON PAGE 15]

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NEWS ANALYSIS

NeXT draws battle lines for 'pro workstation' market

by JOHN BATTELLE

If nothing else, NeXT chairman Steve Jobs can be content with his power of prediction. When he said three years ago that the future of desktop computing lay with UNIX and graphical user interfaces, many scoffed. But today the NeXT machine has become what some are calling "the first computer designed for the '90s," and most of the workstation field is scrambling to provide features that NeXT already has.

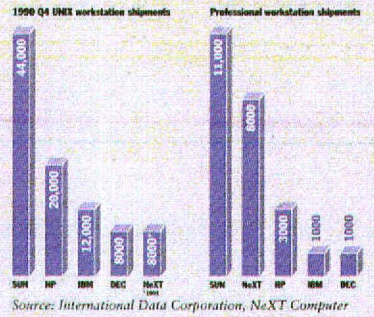
But features alone don't make a horse race, as NeXT has learned through several years of painfully slow sales. So it's no surprise that the company tooted its own horn when it showed its first respectable shipment numbers in the first quarter of 1991. NeXT claimed 8000 units shipped, compared with fourth quarter 1990 numbers of 44,000 for Sun, 20,000 for Hewlett Packard, and 12,000 for IBM. DEC also came in with 8000.

But NeXT says it is selling into a new niche, the "professional workstation" market, rather than the scientific and engineering workstation realm. In the professional workstation market, NeXT asserts, its 8000 machines sold is second only to Sun's 11,000 units.

The professional workstation

NeXT defines a professional workstation as one that "combines the power and networking of today's best workstations with the ease of use and productivity applications of today's best personal computers." According to George Pavlov, manager of NeXT's sales strategy team, people who use them have hit a "technical ceiling" with personal computers. These users are developing mission-critical applications and running large networks, and they require more powerful versions of productivity software, such as spreadsheets and databases. They are also interested in multimedia and electronic mail.

NeXT gains in professional workstation market



Source: International Data Corporation, NeXT Computer

NeXT is not alone in recognizing this new market. International Data Corporation (IDC), an industry research firm, estimates that 300,000 professional workstations will be sold in 1992, compared to 50,000 in 1990. "We are pretty bullish on that market," said Doug McLeod, editor of IDC's *Computer Industry Report* newsletter.

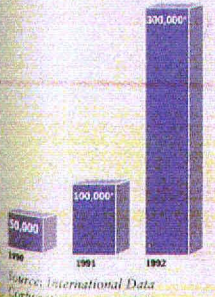
In addition, every major computer company has targeted this hybrid workstation/personal computer market–PC makers with high-end machines, workstation vendors with entry-level offerings. And a consortium of 21 computer manufacturers, including Compaq, DEC, Microsoft, and MIPS recently announced ACE (Advanced Computing Environment), which they claim will bridge both markets by supporting major PC and workstation hardware and software standards.

But ACE, which will be based on the not-yet-shipped MIPS R4000 RISC chip, is still a long way off. For the present, that leaves NeXT with four tough competitors in the professional workstation market: Sun, Hewlett-Packard, DEC, and Apple.

Price and performance

The professional workstation market can be broken down at two major price points: $10,000 for color and $5000 for monochrome. Many manufacturers, including NeXT, Apple, IBM, Sun, HP, DEC, and Compaq can claim machines in these price ranges, but performance and standard equipment vary widely.

Professional workstation market poised for growth



Source: International Data Corporation *projected

Low-end workstations based on UNIX and RISC or high-end CISC processors can claim robust features, such as true multitasking and built-in networking, but the actual systems often come up short. Sun's lowest-priced workstation, the SPARCstation SLC, retails for $4995. It runs at 12.5 MIPS and 1.25 MFLOPS. But for that price you get a bare-bones monochrome system with 8MB of RAM, no hard disk, and no system software.

The company that is closest to NeXT in terms of price and performance is Hewlett-Packard. The HP Apollo 9000 425e workstation lists for $5490 and features a 25MHz 68040 processor (the same as the NeXT's) and can display 256 shades of gray (compared with four shades on the NeXT). But the workstation lacks a local hard disk, and an internal 3.5-inch floppy disk drive costs another $500.

DEC gives more bang for the buck: its $4995 DECstation 3100 runs at 15 MIPS and 4 MFLOPS, but like the others it is monochrome and diskless.

High-end personal computers, such as Apple's Macintosh IIfx or IBM's PS/70 series, offer workstation performance and a full set of software configurations but can cost well over $10,000. PC manufacturers' less expensive models cannot claim workstation performance.

By comparison, NeXT offers its four-tone grayscale NeXTstation, based on Motorola's 68040 processor, for $4995. That price includes a 105MB hard disk, 8MB of RAM, a 2.88MB floppy, and built-in Ethernet. It also includes what may be the industry's most elegant graphical user interface, a dictionary, built-in multimedia support, mail, a thesaurus, word processing software, and a host of other programs. Its performance–at 15 MIPS and 2 MFLOPS–is well within its competitors' range. NeXT's color offerings–at up to $4000 less than rival workstations–are also a value.

So why doesn't it sell like hotcakes?

Workstations are grabbing the middle ground

Where workstation sales come from	
Replacing minicomputers	54%
Replacing mainframes	22%
Upgrading from PCs	24%

Source: Prudential Securities

Applications support

The professional workstation is in part defined by the existence of powerful productivity applications and hardware peripherals. High-end PCs have a slew of them; low-end workstations are still struggling to attract developers. While there are more than 2000 applications written for Sun's machines, the applications directory reads like an introductory text in graduate-level engineering or chemistry. Only a few major software vendors, including WordPerfect and Lotus, have ported their applications to Sun's OpenLook operating system, although more have promised to.

NeXT also suffers from a lack of productivity applications. While it claims applications in the hundreds, only a handful are in the spreadsheet, word processing, and database arenas.

NeXT claims that it has a trump card in the race to woo applications developers–the NeXTstep user interface and development environment. Developing for a graphical user interface is not easy for either custom in-house developers or commercial software vendors. There are a number of UNIX interfaces from which to choose–Sun's OpenLook, HP's NewWave, OSF/Motif and OSF/1, to name a few–and committing to one is a crucial allotment of developer resources. NeXT has addressed this problem by integrating an object-oriented graphical interface with its development environment, which it claims cuts development time dramatically.

NeXT's interface has analysts impressed but still skeptical. "Most of the senior developers for other (computer) companies share the view–whether or not they think NeXT will be successful–that NeXT is the best embodiment [of the next generation of computers]," said Jonathan Seybold, publisher of Seybold publications. "But NeXT has still got one hell of a challenge, starting this with essentially no installed base."

Channels

A company without a large installed base must also convince dealers and value-added resellers (VARs) to sell the machines, no small task considering the training, service, and support involved. NeXT has had its ups and downs with this channel, including a much-trumpeted deal with Businessland that has since fallen flat. "The big question, as we have posed for two years, is how well can they develop a channel to . . . beat out Sun, Apple, IBM, and Compaq," said IDC's McLeod. "Their biggest challenge is clearly getting to a customer base . . . the channels are already flooded."

NeXT asserted earlier this year that it plans to sign up 100 VARS and 100 dealers by year's end–small numbers compared with the number of Sun authorized dealers and VARS, and tiny compared to the established channels developed by large PC makers like IBM, Compaq, and Apple.

For NeXT, it may all come down to getting the word out. "I think NeXT's real problem is getting visibility," said Paul Cubbage, associate director of UNIX systems software services for Dataquest, a San Jose-based market research firm. "As good as Jobs is [at that] . . . the people out there making noise about workstations are IBM, DEC, HP, and Sun, and they have loud voices."

Some analysts like to compare NeXT to Steve Jobs's other start-up company: Apple Computer. Like the first NeXTcube, Apple's Macintosh started as an expensive, slick machine that was ignored by most of the serious computer world. But after several years and significant revisions, Apple's Macintosh now enjoys a respected position in the business environment. Many in the industry say it set the standard by which desktop machines in the 1980s were judged. By redefining itself as the ideal professional workstation, NeXT may have drawn the desktop battle lines for the 1990s.

"I don't think there is anyone in the industry who would contend that anything matches what NeXT has now," Seybold said. "The question is how much does that matter?"

***NeXTWORLD* Extra is a news supplement of *NeXTWORLD* magazine. It is bound into each issue of the quarterly magazine and shipped separately to subscribers in months that the magazine is not published. Lt. Sullivan's column and articles about unannounced NeXT products are reported and written by contributors without guidance from the *NeXTWORLD* staff.**

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BUSINESS NEWS

NeXT realigns marketing team

by DAN RUBY

Redwood City, CA – Shortly after staking out a new position for its products in the professional workstation market, NeXT reorganized its marketing department, placing the group under Vice President of Sales Todd Rulon-Miller and bringing in Microsoft marketing veteran Mike Slade as director.

The company also scaled back its internal creative services team and awarded its marketing communications account to Cleary, Kvamme & Suiter. NeXT's advertising agency, Ammirati & Puris, dropped NeXT as a client, citing a conflict with its Nikon account. NeXT named no new agency.

NeXT has been frequently criticized for lacking a coherent marketing strategy. "NeXT has done a great job of telling the world about its technology but not of communicating whom the technology is for," said Slade.

He said that NeXT would pick two or three application areas, possibly customer development and professional graphics, to emphasize in upcoming [CONTINUED ON PAGE 15]

Market takes off in Europe

by DAN LAVIN

Geneva, Switzerland – The NeXT computer is a big hit in Europe. Following its show-stealing appearance at CeBIT, the large German computer show, last spring, the company has scored sales coups, established distribution channels, and localized the NeXT for use in foreign markets.

According to Theo Wegbrans, president of NeXT Europe, the region will at least triple its first-quarter performance in the second quarter. Given NeXT's announced first quarter sales figures, of which 15 percent came from Europe, this should mean that Europe will account for more than 3500 units in the period from April to June. Wegbrans also estimates that the software and peripheral market in Europe is three-quarters the size of the base hardware market, making a market of $22 million per quarter for NeXT third-party products.

While the United States has only several dozen dealers signed up, Europe has 100 NeXT Centers in place. Each Center commits to making a $1 million investment in setting up a sales, training, and support organization, exclusive of inventory. NeXT Centers also provide value-added services such as custom development.

Wegbrans points to this readiness by dealers to invest heavily in support as a key to NeXT's success in Europe. Because computer makers have traditionally neglected the European market, local dealers developed full support services. When customers moved to workstations, dealers already had a huge investment in the infrastructure to provide the additional services workstation support requires.

On a parallel track, Europeans have embraced UNIX much faster than those in the United States. Their markets have long been dominated by giants like Siemens, Bull, and Philips, which have traditionally sold proprietary, non-compatible operating systems. Many have reacted by turning to UNIX, Wegbrans said.

NeXT has also localized its products for major European markets, having shipped versions for France, Germany, and the United Kingdom in July. The NeXT operating system on every machine includes the capability of switching between languages; the localized versions also include special keyboards, local regulatory approvals, and translated user documentation.

Kanji OS ships

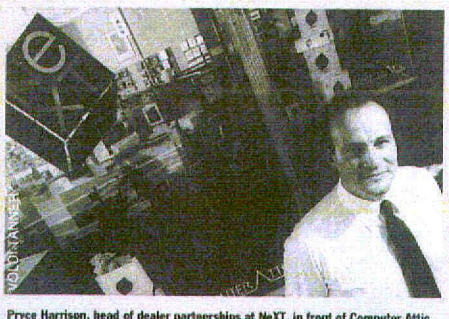
Tokyo – NeXT Japan announced the shipment of NeXTstep 2.0J, a localized version of the NeXT operating system, on June 18. The release optimizes the NeXT for use in Japan with Japanese menus, prompts, and screens. User and technical documentation is also available in Japanese. James Higa, Representative Director of NeXT Japan, said, "Japan is a wide-open market–one of the fastest growing markets for the taking. We did well with an English product, and now that Kanji is here sales are only going up." Any NeXT application that uses the text object will automatically allow the typing of Japanese Kanji characters instead of English by merely selecting a Japanese font. The NeXT system's Display PostScript makes it the only system to allow the use of any size font in Japanese, a key competitive advantage here.

NeXT looks to regional dealers

by LAURA FREDRICKSON

Redwood City, CA – Six months after cancelling its exclusive distribution deal with Businessland, NeXT is actively courting small dealers.

"We haven't signed any chains; it's the regional independents we're looking at," said Pryce Harrison, manager of dealer partnerships at NeXT. The company is targeting smaller dealers because it wants the "value added" rather than the "high-volume, commodity-type product" approach, he explained.



Pryce Harrison, head of dealer partnerships at NeXT, in front of Computer Attic in Palo Alto, California, one of NeXT's newly signed independent dealers.

NeXT severed its relationship with Businessland completely in May. Since the beginning of this year, NeXT has signed up 25 dealers; the goal is 100 by year's end. About NeXT's search for new dealers, Harrison said, "If they're carrying high-end PCs, they're good prospects."

Dealers are also approaching NeXT directly. One is Bruce Waldack, president of Desktop Publishing Center Corporation in Alexandria, Virginia, an independent Macintosh dealer. Two years ago, when he approached NeXT to be a representative, the company brushed him off. Today, Waldack is the only NeXT dealer in the Washington D.C. area.

Other prominent dealers the company has signed include Computer Attic (Palo Alto, California); Random Access (Denver, Colorado); MacUniverse (Tarzana, California); PCSI (New York); and Advantage Computer (Burnaby, British Columbia).

Being the only NeXT dealer in town can be a double-edged sword: although a dealer may get all the business in one area, he must also market to and then service the entire region as well, said John Budakovich, marketing manager of The Data Place, in Lynbrook, New York.

Indeed, some industry watchers question whether NeXT's new direction will generate enough badly needed sales. "It's at the high-volume dealers where they'd get the traffic they need," said Nicholas Baran, who formerly published Baran's Tech Letter. "The public still cannot go out and see a NeXT computer in most parts of the country."

NeXT Ink

by DAN LAVIN

Cabbage Patch Cubes

There's a certain charm to customization. For dolls, it's great if every one is slightly different. But this is less desirable for computers, however–and long-time NeXT users know what I'm talking about.

NeXT has a long history of making small design changes without telling anyone. It started with the faulty SCSI chip that shipped with the first thousand original cubes. NeXT never acknowledged the problem; they just quietly changed the chip. When it became obvious that the cube's cooling system wasn't doing its job well, NeXT changed the design of the air vents and the direction of the fan, but again the company didn't acknowledge the problem or announce the changes.

With no announcement, the '040s began shipping with the universally hated new keyboard–a keyboard actively inconvenient for UNIX developers. There was never any explanation from NeXT, nor did NeXT offer users the old keyboard as an option.

Then came the two most serious in-line surprises. First, the 17-inch color monitor. While the 21-inch is clear and crisp, the 17-inch shipped with serious convergence problems. NeXT is improving the monitors in increments by working with the manufacturers, and in an uncharacteristic step, it announced the problem in a press release from NeXTedge. Unfortunately, pre-release orders were filled with the fuzzy, non-exchangeable monitors.

System 2.1 is another headache. NeXT shipped System 2.0 with some bugs that were swiftly eradicated in System 2.1. Unfortunately, NeXT took the position that 2.1 was primarily to add color support and that the average user did not need to upgrade, despite the fact that all current systems ship with 2.1. The problem is that anyone making serious use of serial ports or trigonometry is likely to encounter the bugs.

It's unclear how many users are affected by the bugs, but NeXT should upgrade all users for free. Instead, it charges for this interim upgrade–not just for materials, but for the license too. That means it's illegal to get a copy from a friend. I say that NeXT should come clean on 2.1 and give it away.

Overall, NeXT does an excellent job of customer service and support. But NeXT could fix a major hole in its corporate policy by stopping the surprises and giving customers a fair way to react. Otherwise, it might as well go all the way with the Cabbage Patch model and package NeXT computers with adoption papers.

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BRIEFS continued

and can generate output files in PICT, TIFF, or PostScript format. Pixar can be reached at 415/236-4000.

Adamation will ship its Live Wire conferencing software for the NeXT in August, the company said. With Live Wire, users can carry on an ongoing dialog and collaborate on shared documents, which can include text, images, and sound. Live Wire will be priced at $195 per node. Adamation can be reached at 415/452-5252.

Maynard Electronics announced that its ArchiveST series of SCSI tape drives are compatible with NeXT computers. Two backup systems are now shipping: a 2GB DDS-format external DAT drive ($4475) and an external 525MB quarter-inch cartridge drive ($1880). For information, call 800/821-8782.

Hard drives: NeXT introduced a 1.4GB Wren 8 with a rated access time of 15ms. It lists for $5995. Micronet Technologies (714/837-6033) began shipping a full line of storage products for the NeXT, including fast disk drives from 300MB to 1.35GB, 40MB and 80MB SyQuest drives, and a 600MB Sony optical system. Prices range from $2445 to $7495. Microtech International (203/468-6223) is shipping its line of Eclipse hard drives, ranging in size from 200MB to 1GB and in price from $1899 to $5399. It also offers a $1399 50MB removable cartridge drive and a fast CD-ROM drive for $1099.

Ensuing Technologies (Las Vegas) said it would ship a subset of its Papyrus forms-design software by September. The initial module will include predefined forms for general office functions, including phone messages and intercompany announcements. The module will be priced at around $150. The full program, with tools for laying out custom forms, will follow later this year.

Coda Music Software will not be developing its MusicProse software for the NeXT after all. The Bloomington, Minnesota, company announced a NeXT version of its music notation editor last September, but now says that it will concentrate on its Macintosh and Microsoft Windows offerings.

NETware

[CONTINUED FROM PAGE 12]

"It will save a lot in setup and maintenance time and may provide a speed boost," said Kosiur.

Both Kosiur and Wells agree that NeXT computers are unlikely to be used as NetWare servers. "I think NeXT has a lot of advantages meant more for the client, none of which would show up on the server side," said Kosiur.

Wells hinted that support for Microsoft's LAN Manager and other network systems may be forthcoming. "We are definitely looking at all the big-name LAN vendors, but everything is very preliminary," he said.

The move to support NetWare and AppleShare is part of a larger strategy to make NeXT more attractive to corporate buyers. "We've had a bad rap for being a non-open company, but this puts us out in the lead in terms of having an open networking system," said Wells. "We will certainly be the first UNIX workstation to bundle this stuff, and the first to have a such a nicely integrated solution."

NeXTedge

[CONTINUED FROM PAGE 12]

California–with more planned–to conduct classes such as "An Introduction to Interpersonal Computing" and "Building a NeXT Network." A two-day end-user workshop costs $350. NeXT staff members currently teach all the classes, but third-party providers may also be certified as the program grows.

Resellers and users alike will be able to purchase Next Day, NeXT's on-site extended warranty, for approximately eight percent of the equipment list price. Next Day promises "next business day on-site response." For a seperate fee, NeXTedge will also provide initial equipment setup.

Software support consists of several parts: the Technical Support Hotline, a more focused system of phone support than that which has been in place for the past three years, is an annual subscription service available via telephone and electronic mail. Qualified customers and resellers can tap in for $2500 a year.

In June, NeXT added "The Support Bulletin." Offered on-line and in print, this regularly published update covers hardware and software concerns and offers technical tips. Authorized service and support centers receive the publication free of charge; users pay an annual fee of $120.

The third subscription service is "NeXTanswers," a software library of answers to commonly asked technical questions, presented in a Q&A format on floppy or optical disks for $120 annually. It is also freely available from the NeXT Internet archive servers.

For more information about NeXTedge or any of the services, contact Trish Conlon at NeXT (800/848-6398).

Marketing

[CONTINUED FROM PAGE 14]

marketing campaigns. Instead of spending on advertising, NeXT will favor programs like seminars and road shows that "get the product in front of people," said Slade.

CKS principal Tom Suiter was creative director at Apple Computer when NeXT Chief Executive Officer Steve Jobs was Apple's chairman. The company will produce new packaging, collateral, sales promotion, and other materials for NeXT.

C-Cube

[CONTINUED FROM PAGE 12]

compression standard.

Criticizing the computer industry for providing "crummy" video for ten times the cost of a relatively high-quality $300 VCR, Jobs said the industry should take the lead in developing a "CD player on steroids," which would play both sound and real-time video. The computer and consumer electronics industry should work together on MPEG, said Jobs. C-Cube demonstrated a prototype MPEG chip at the conference.

Instead of using C-Cube's JPEG chip, NeXT equipped the NeXTdimension with a generic connector for future add-on compression boards. Although C-Cube acknowledges that it "missed the window of opportunity with NeXT," the company hopes that NeXT will consider it in the future, according to Mauro Bonomi, C-Cube's director of marketing.

Meat and (cold) potatoes for Lt. Sullivan

As Lt. Sullivan put his lunch tray down on the cafeteria table, he scanned the room, easily separating the field operatives from his fellow desk jockeys. For the thousandth time he considered whether you could actually do more to change the world from out in the field or from an office, as he had been trying to do for the past six years. The mashed potatoes were cold again.

He ignored the potatoes and mentally sorted through the reports that had come in from the Agency's intelligence network, wondering what he'd have to do to save NeXT's marketing bacon this time. He hated reading those business magazine articles saying that the technology was great but had missed its market window. Clearly, the reporters hadn't ever spent quality time with the machine. What could he do? He certainly couldn't let them into the secure walls of the Agency to tour the rows of sleek black workstations keeping everyone connected and productive.

*

Now here was an interesting rumor, thought Lt. Sullivan, leafing through his report.

Seems that Sun Microsystems had picked up a copy of NeXT's Fall 1990 *Software and Peripherals* Catalog and let their fingers do the walking. After all, why should all this nice software run only on black computers? In the course of its hunt, Sun had come across a couple of unhappy NeXT developers, and the Sun platform has benefitted from NeXT's gaffes.

One fumbled product was FutureShock, a HyperCard-like authoring system that includes an object language called FutureTalk and runs most HyperCard 1.x stacks on the NeXT without modification. The product was strong, but the user interface hadn't done much for Steve's sense of aesthetics, and he'd said so. The package is now being developed for the Sun. Fortunately, another player who had seemed to be dropping the ball on a HyperCard work-alike had brought in some fresh talent, and H^3 is back on the road to shipment.

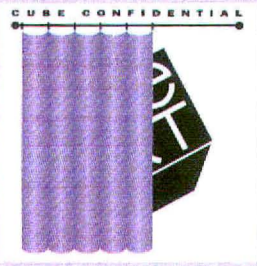
Lt. Sullivan grinned as he reread the next missive. Now that Adobe has finished Illustrator 3.0 for the NeXT, the real gem in the collection may be in progress–a quietly developing PhotoShop. It should be out next year. What should come sooner is Stealth, the "Illustrator-killer" those hombres out in Texas are cooking up. The agreement with Aldus says they can't call it "FreeHand," so the good ol' boys are briskly pouring through Digital Webster for something fresh.

Pages Corporation is quietly working in San Diego on the next generation of page layout software. PageOne was shown at Seybold last spring, but no one has yet seen PageTwo–the piece that controls style guidelines and parameters for the environment. The duo is designed to scratch the itch of those corporate customers who paid big money to a design firm to create a corporate look only to watch desktop publishers in their organizations crank out garbage on corporate letterhead.

The latest secret at Pages is its negotiation with Ashton-Tate to acquire the rights to PowerStep, reshape it to look more as the principal architect originally envisioned, and release it as a possible presentation, charting, and graphing partner for Page One.

*

With third-party development on the fast track, Lt. Sullivan's attention turned to what was going on inside NeXT. He recently enjoyed one of NeXT's warehouse parties, where the Sierra Nevada Pale Ale flowed freely and the information seeped out slowly.



It was looking like a fourth quarter 1991 announcement and a second quarter 1991 ship date for NeXTstep 3.0 and a new model of NeXT machine. NeXTstep 3.0 will beat several other computer manufacturers to the punch with fully implemented symmetrical RISC-based multi-processing. Currently, the fad seems to be to put multiple processors on the motherboard, use them for a few selected processes in your OS only, and call that multi-processing. NeXT has something much more comprehensive in mind.

Watch for support in NeXTstep 3.0 for handling several sorts of telecom tasks and other fun things. Best of all, System 3.0 won't be anywhere near as slow in coming as Apple's System 7.0 was. Now if NeXT could only learn that lesson about font installation that their cousins finally learned after seven years . . .

The NeXT portable? Now that users have had a couple of years to become very attached to MegaPixel displays, NeXT is not going to be able to foist some optical disk-sized display on us and call it a tool for the real world. But since larger displays are not only big and heavy but also require big and heavy power supplies, major breakthroughs in display and power technology will be needed to make a portable suitable for the NeXT platform. Development is underway, technology notwithstanding.

If you have any hot tips, quietly e-mail me and I will slip you a hard-to-acquire NeXTWORLD *T-shirt. I managed to sneak a few to Steve for his personal signature, but the supply is limited, so speak up quickly. I pick up e-mail at Sullivan@nextworld.com and voicemail at 415/978-3189. Don't call the Agency. They don't know I'm doing this.*

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Adobe Illustrator® has already proven its talents on hundreds of thousands of desktops the world over. Now Adobe unleashes its power in the industry's richest graphical environment: Presenting Adobe Illustrator for NeXT™ computers.

Taking advantage of features unique to NeXT computers, it streamlines the whole process of page design.

One of the first things you'll notice in the NeXT version of Adobe Illustrator is that things happen almost instantly. When

ADOBE PRESENTS THE MOST POWERFUL ILLUSTRATOR EVER SEEN.

you reposition an image on your page for example, it appears right away–no waiting for the screen to "refresh." Zooming in and out is every bit as quick.

You can drag-and-drop EPS and even TIFF files into your document and they are displayed as actual art. There's no need to work with placeholders instead.

And with the NeXT version of Adobe Illustrator, preview mode is not strictly for looking. You can actually edit your work there, saving even more time.

This version of Adobe Illustrator offers all the advances Adobe has made on other platforms, including tools for font editing and text effects. It also offers new features, such as customized grids and sophisticated autotracing for color files.

The result is a complete design package, with a full selection of high-end tools for creating both graphics and text.

In all modesty, we'd have to say there's never been a program that can take you from concept to final color separation with this kind of speed and confidence.

But then, who better to create the most advanced program for the pure PostScript® world of NeXT, than the company that created PostScript in the first place.

ADOBE



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Only one computer makes it possible for Adobe Illustrator to offer such powerful design tools, and display work in such fine detail: The NeXTstation™ computer.

It's designed to take you to a far higher level of perfomance, and still be perfectly simple to use.

At its heart lies Motorola's warp-speed 040 chip, so even complicated pages can be manipulated without delay.

And, unlike most desktop computers, the NeXTstation uses one unified system–

NeXT PRESENTS THE ONLY PLACE YOU'LL SEE IT.

Postscript–to generate every image you see on screen and on paper.

That means you get true "WYSIWYG." It also means Adobe Illustrator can finally flex its muscle in a pure PostScript world. Which is why artwork can be so rapidly moved, edited and zoomed.

Image quality is unprecedented as well. The MegaPixel Display gives you a very large workspace and a level of detail you haven't seen on a computer before. (Add 4,096 colors if you go the NeXTstation Color route. And, if you insist, 16 million more with NeXTdimension™: the world's only true 32-bit color PostScript system for photographic image quality.)

And because it's a genuine multitasking machine, a NeXT computer allows you to have all your applications open and linked without any performance degradation.

Even the most basic NeXTstation is amply equipped for programs as advanced as Adobe Illustrator. Starting at $4995, you get 8MB of memory (expandable to 32), a 2.88MB floppy and 105MB hard disk–with an option for the 400MB variety.

For your free copy of our NeXTstation brochure, call us at 1-800-848-NeXT. You'll discover that in the world of NeXT, software is more than powerful. It can be positively eye-opening.

Circle 12 on reader service card

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SPECIAL REPORT

NeXT aimed somewhere over the rainbow when it entered the realm of color this spring with the delivery of its NeXTstation Color and NeXTdimension systems. Although it trailed other workstation manufacturers into the color market, NeXT's color hardware and system software are implemented with unique features and characteristic NeXT style.

Plunging

But design specs are one thing; tangible user benefits are another. To find out whether NeXT's implementation is truly a horse of a different color, this special report looks at NeXT color hardware, software, and applications through the prism of the user experience.

The three-part package is based on extensive hands-on experience with the new machines. Contributing Editor Don Crabb put the systems through the paces at his University of Chicago lab. Desktop publishing pundits Tony Bove and Cheryl Rhodes cast their critical eyes on Adobe Illustrator for NeXT, the most ambitious color application software currently available. And Senior Editor Dan Lavin examined the options for connecting color scanners, printers, and other peripherals to the NeXT boxes.

The bottom line: The NeXT systems hold great promise to redefine both the features/benefits and price/performance curves for color computing. But more support from third parties is needed before users will find a pot of gold at the end of NeXT's rainbow.

PRIMARY COLOR

BY DON CRABB

NeXT's double-barreled entry into color combines innovation and affordability.

With the recent shipment of its NeXTstation Color and NeXTdimension systems, NeXT has entered the color market as it has every arena–doing things its own way.

For those accustomed to the market-leading 8-bit and 24-bit color systems from Apple and Sun, NeXT's redefinition of the low and high ends of the market as 16 and 32 bits of color comes as a revelation. So does NeXT's superb implementation of the alpha channel to convey transparency information, and the machine's elegant interface tools for managing color.

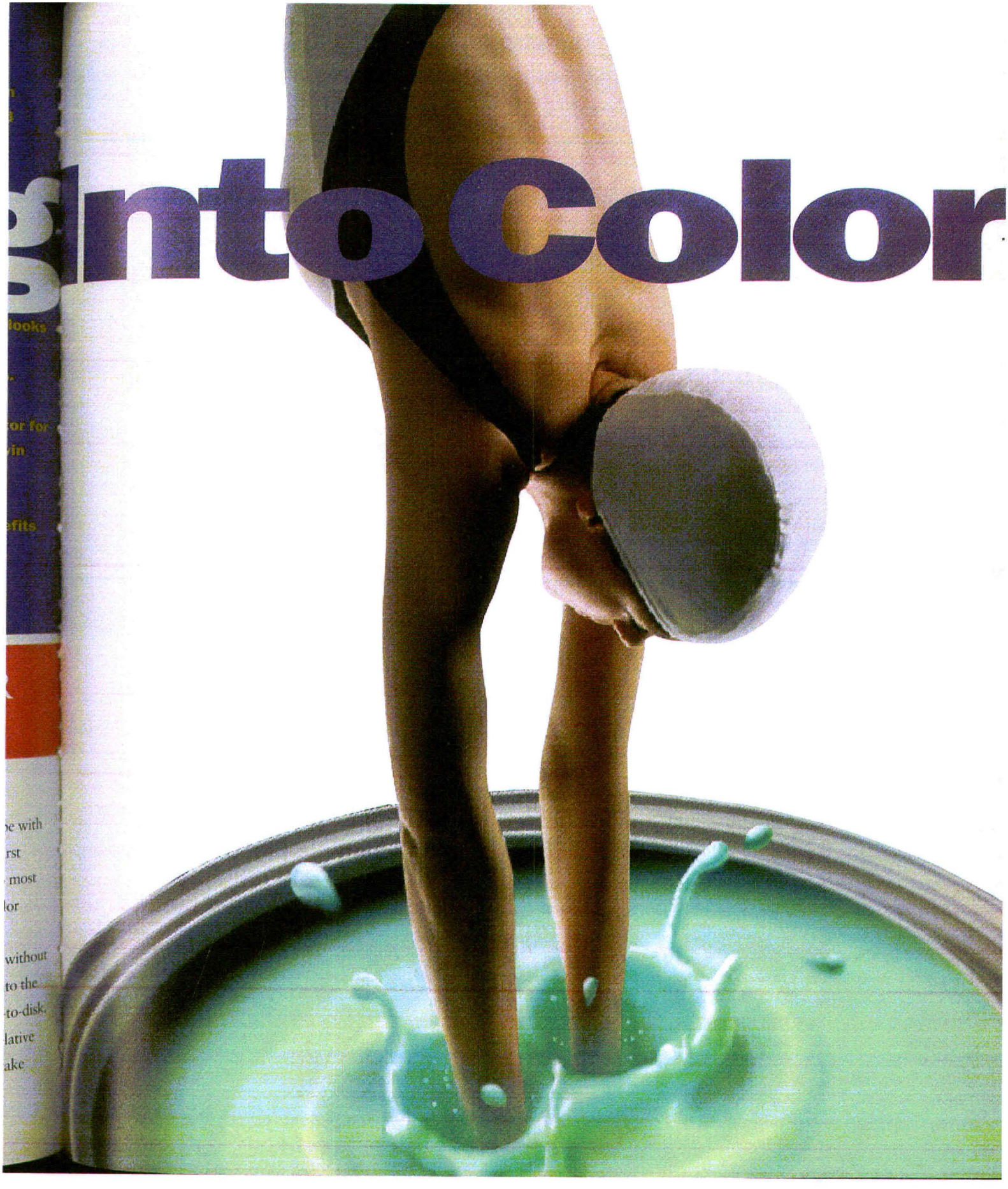


All of this comes at highly aggressive prices–about $8000 for the 16-bit NeXTstation and about $15,000 for a NeXTcube with the 32-bit NeXTdimension board. In my tests of some of the first shipping units of the two systems, I found that they lived up to most of their prerelease hype. There is no better value for serious color computing on the market today.

The only disappointment is that NeXTdimension shipped without JPEG (Joint Photographic Experts Group) compresson built into the hardware, so it can't handle real-time video-to-disk. The other limitation is a familiar one: the relative paucity of color-capable software that can take advantage of the new hardware.

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Seamless integration

As developers and buyers take note of NeXT's innovations, software is sure to come. The NeXTstation Color and NeXTdimension support a superb color-imaging model that should make it a snap for third parties to create some spectacular, powerful applications. The unified PostScript imaging model springs into color effortlessly; the same Display PostScript code that drives a monochrome display simply works in color on the NeXT color display, ensuring effortless compatibility of files between color and non-color NeXT workstations.

The NeXT implementation of Display PostScript is painstakingly true to Adobe's PostScript standard, so current and future NeXT customers don't have to worry about going through the imaging model transitions that Apple's customers are now going through with the changeover from the QuickDraw/Post Script model to the TrueType/QuickDraw/PostScript melange.

Perhaps the most impressive feature of NeXT's color is how it is integrated into the user interface. NeXTstep 2.0's well-thought-out support for color can be seen in such features as its Colors panel and color wells (see the sidebar "Color à la Mode"), which make using the system uniquely intuitive.

One thing you don't see in the interface is indiscriminate use of meaningless color. According to Keith Ohlfs, interface guru at NeXT, NeXT doesn't want to see the "purple menus and pink windows" that have shown up on other systems that add color. The 2-bit gray-scale interface (in contrast with other machines' single-bit black-and-white) provides sufficient definition within the basic NeXT interface as well as an effective background for color information that appears in windows. Application icons use color only if the application has color capabilities.

Added to NeXT's base machine, any type of color would make the NeXT an appealing choice for the large number of users who simply prefer color in the interface. Even if you only use the Improv spreadsheet and the WordPerfect word processor, using them in color brings their functionality to life. And color is necessary for some applications, such as publishing, graphics, and engineering and related scientific work. Trying to get the same level of performance out of a SPARCstation, a Mac, or a machine from IBM or HP/Apollo would involve shelling out many thousands more and result in a less-integrated solution (see the sidebar "Color Systems Compared").

What do you get with 16 bits?

The NeXTstation Color redefines the standard for low-end color–16 bits, as opposed to the 8 bits of competing systems. Actually, only 12 bits are used to describe color (4 bits each for red, green, and blue, permitting up to 4096 colors, rather than the 256 colors of 8-bit systems). The other 4 bits are reserved for the alpha channel, which contains information about pixel transparency.

Alpha itself is not new (see the sidebar "Alpha Bits"), but NeXT's use of it is the first coherent, system-level implementation in a modestly priced graphics system. The alpha channel information adds a dimension of realism not available on any other system. I found it especially helpful for combining images with see-through elements.

As for color fidelity, the 16-bit system yields greater depth and realism to images on a NeXTstation Color than the equivalent images on an 8-bit system. When

Alpha Bits

The alpha channel had its genesis in a 1984 paper by Thomas Porter and Tom Duff (then of Adobe, now at Pixar). Now, it's what makes color on the NeXT different from color on any other computer graphics system commonly available.

While most high-end computer graphics systems store three values for every pixel (red, green, and blue), NeXT systems store a fourth: the alpha value, which defines how transparent an object is. Every pixel includes an alpha component.

The idea of alpha is to make color images act real when they are manipulated. Let's say you have a bitmap of a Ferrari. You can't see through the body of the Ferrari (those pixels have an alpha value of 1.0), but the tinted windows might have an alpha of 0.7; that is, they are somewhat transparent. And wherever there is no car in the bitmap, under the tires or over the hood, the bitmap would be completely transparent, or clear, with an alpha of 0.0.

The use of alpha becomes clear when you paste this bitmap of the Ferrari onto a picture of a street: you see the background partially through the windows, but it's not as clear as the background over the car's hood.

Alpha also adds realism to the NeXTstep user interface. For example, some of the pixels in the WriteNow icon are transparent, so that when you drag a file icon into a folder, you can see the folder opening underneath.

The pixels get their alpha values in a number of different ways. Ideally, scanner software and rendering programs would attach alpha values to each pixel as it is created. Renderman is the first program to offer that type of sophisticated support. NeXT's Colors panel (see the sidebar "Color à la Mode") provides controls for opacity in several of its color modes, enabling users to add opacity specifications to any color. TopDraw, on the other hand, uses alpha only in the user interface. The user can assign alpha values to objects, which helps when placing those objects in complex constructions, but the image loses the transparency information when it's printed. Illustrator doesn't support alpha editing at all.

Most NeXT graphics-handling software (such as the developer demos Grab, Scene, and Icon) can save TIFF files with or without alpha information (saving a TIFF file with alpha increases its size substantially). Since the alpha channel is unique to NeXT, the alpha information can cause some problems when exporting NeXT color files to non-NeXT software. Programs that save files in EPS (Encapsulated Post Script) format, such as Adobe Illustrator, should have no problem. Most such programs omit any Display PostScript information– including alpha–when creating EPS.

For display, the alpha channel has the same device independence as any other PostScript information: any NeXT computer can display an image with 0, 2, 4, or 8 bits of alpha. A monochrome NeXT displays 2 bits of alpha; the NeXTstation Color, 4 bits; and the NeXTdimension, 8 bits.

SIMSON L. GARFINKEL



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Color Systems Compared

Although IBM and HP/Apollo make good UNIX workstations, neither of them has done much yet for providing strong color support for their users. Assuming that you need a color station at a fairly reasonable price, the leading competitors to NeXT are the Sun SPARCstation 2 and the Apple Macintosh IIfx running A/UX, Apple's UNIX.

The Macintosh's abundant applications and great GUI make it strong competition. Any well-behaved application that runs under Apple's System 7.0 can also run under A/UX (although System 7.0 itself won't yet). But, as shown in this chart, piecing together a Macintosh system to rival the NeXTdimension takes some third-party hardware and upwards of $18,000. If you want to run A/UX, add another $1700 for A/UX on CD-ROM and a CD-ROM player.

Sun still lacks the support from third-party vendors that a company with their giant lead in workstations ought to have (probably because they only settled on their OpenLook GUI recently, having previously courted two other GUI systems). But they have started to attract Lotus and other important developers. Sun makes solid hardware, and its networking software sets the standards by which the other workstation vendors live (they invented the Networked File System). The Sun GUI (OpenLook 2) is a good one, though not as easy to use as NeXTstep. OpenLook can support 8- and 24-bit color, without an alpha channel. And with all Sun's strengths in networking, it hasn't yet reached the ease of installation that NeXT's system administration tools provide.

This chart shows equipment and price specifications of the NeXTcolor stations and roughly comparable systems from competing vendors. Note that the systems are not exact, but the closest that can be assembled with competing hardware. We've chosen a top-of-the-line monitor for the NeXTdimension and comparable systems.

	NeXTstation Color	NeXTdimension	Macintosh IIfx		Sun SPARCstation 2	
			...NeXTstation Color	...NeXTdimension	...NeXTstation Color	...NeXTdimension
List price[1]	$7995 (includes 17-inch MegaPixel Color Display)	$7995 for NeXTcube $3995 NeXTdimension board $2995 21-inch MegaPixel Color Display	$8669 for CPU $1999 for Apple 8•24 GC Color Card $999 for 13-inch Apple color display $89 for monitor stand	$8669 for CPU $3999 for a SuperMac Spectrum/24 PDQ Color Card $4400 for SuperMac 21-inch monitor $2195 for a Radius TV card (real-time video)	$19,995 (includes 19-inch color display and 8-bit accelerated color)	$26,995 (includes 19-inch color display and 24-bit accelerated color)
Total	$7995	$14,985	$11,756	$19,263	$19,995	$26,995
Colors	12-bit plus 4-bit alpha	24-bit plus 8-bit alpha	8-bit	24-bit	8-bit	24-bit
Processors	25MHz 68040 CPU 56001 DSP Integrated Channel Processor	25MHz 68040 CPU 56001 DSP Integrated Channel Processor Intel i860 33MHz RISC graphics processor with 8MB (expandable to 32MB) frame-buffer RAM	40MHz 68030 CPU, 32KB write-through external cache Apple sound chip Two serial I/O processors 40MHz 68882 FPU		40MHz SPARC CPU, 64KB write-through external cache 40MHz SPARC FPU SPARC sound processing	
Memory	12MB RAM (expandable to 32MB) 1.5MB DSP static RAM, expandable to 576KB	12MB (expandable to 96MB)[2] 4MB VRAM 24KB DSP static RAM, expandable to 576KBKB	4MB RAM (expandable to 32MB) 1MB VRAM 512K ROM		16MB RAM (expandable to 32MB); color framebuffer	
Network Interface	Ethernet (thin or 10Base-T)	Ethernet (thin or 10Base-T)	LocalTalk AppleTalk		Ethernet (thick or 10Base-T)	
DMA Support	Multiple channels, built in	Multiple channels, built in	SCSI only		Multiple channels, built in	
Storage	3.5-inch 2.88MB floppy drive 105MB hard disk	3.5-inch 2.88MB floppy drive 105MB hard disk	3.5-inch 1.44MB floppy drive 160MB hard disk		3.5-inch 1.44MB floppy drive 207MB hard disk	
I/O	Thin Ethernet Twisted-pair Ethernet SCSI/2 Two RS-423 serial ports Laser printer port DSP port MegaPixel Color Display port	Thin Ethernet Twisted-pair Ethernet SCSI/2 Two RS-423 serial ports Laser printer port DSP port MegaPixel Display port Three NeXTbus slots (one occupied by the NeXT dimension board	AppleTalk Two Apple Desktop Bus ports SCSI port Two RS-422 serial ports Microphone port Color monitor port[3] Six Nubus slots (one occupied by the color monitor board)		Thick Ethernet Twisted-pair Ethernet SCSI/2 Two RS-423 serial ports Mono minijack output Color monitor port Three 20MHz Sbus slots(two occupied by the color monitor board for 8-bit system; three occupied for 24-bit)	
Other HW	Keyboard Sound Box[4] Mouse	Keyboard Sound Box[4] Mouse	Keyboard Built-in speaker Mouse		Keyboard Built-in speaker Mouse	
Software	NeXTstep Release 2.1 and bundled applications[5]	NeXTstep Release 2.1 and bundled applications[5]	System 7.0 and bundled applications[5]		SunOS 4.1.1 w/OpenLook 2 and bundled UNIX and OpenLook applications[5,6]	

1. List prices were latest at press time; Sun heavily discounts its prices, so list prices can be somewhat misleading.
2. 8MB (expandable to 64MB) on motherboard, 4MB (expandable to 32MB) on NeXTdimension board.
3. Multiple displays supported via multiple display cards.
4. The NeXT Sound Box includes stereo in/out jacks, video/RGB interface, built-in microphone, and mono speaker.
5. The NeXT and Sun systems include UNIX support tools including text and graphics editors, and shell tools. NeXT includes Interface Builder, WriteNow, Digital Librarian, Digital Webster, system administration tools, and demonstration programs. Macintosh systems include system utilities and HyperCard.
6. Older SunWindows and NeWS GUIs are also available.

you see the slick charts displayed with Wingz 1.1 or the illustrations produced with TopDraw or Illustrator, 16-bit looks sharp indeed. And the dithering technique used by NeXTstep Release 2.0 will let you view 32-bit images from the NeXTdimension without losing much color detail or authenticity.

What's really impressive is that 16-bit color doesn't come at the cost of performance, as it does on a 24-bit color Mac or a large-format RGB display with 8-bit dithered color. I expected to see the whole thing grind to a halt when I opened several applications at the same time, but it didn't. I did manage to throw a wrench into its color performance, but only by simultaneously doing a number of stupid things–like running a beta version of Mathematica 2.0 while also running a beta of Illustrator 3.0, and then trying to use TopDraw. But that same thing would be true on competing workstations–if you could run those apps on them.

The NeXTstation Color has essentially the same hardware as the black-and-white NeXTstation, with a color display and 12MB (rather than 8MB) minimum memory. Of course, a large part of the NeXT color story is in the specs of the basic NeXT platform.

NeXT's facilities for exchanging large files–key for color work–are strong. Both of NeXT's base storage media, the 2.88MB floppy and optional 256MB optical disks, raise the standard for built-in handling of graphics files. For networking, the NeXT's built-in Ethernet support supplies the necessary bandwidth for transporting color files within workgroups. The NeXT networking system is the equal of the Ethernet that Sun, DEC, and IBM (RS6000 series) provide. Yet it's almost as plug-and-play as Apple's LocalTalk, and for a UNIX network, that's pretty impressive.

[CONTINUED ON PAGE 23]

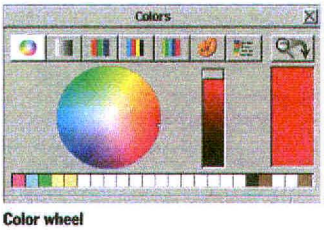
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Color à la Mode

NeXT's color systems are set apart by the system-level features that unify how color is handled by every application (at least, every application that follows NeXT's interface guidelines). The most striking example of this is the NeXT system for choosing colors, which consists of the Colors panel and application color wells. Together they provide a single model for picking colors in any application and enable users to create custom palettes that are available in any application and to any member of a workgroup.

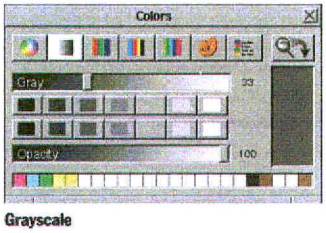
NeXT's Colors panel is a tool for creating, storing, and moving colors between applications. The ready-made Colors panel is provided in the developer's AppKit, ready for any developer to drop into an application. Once installed, it shows up in an application's menus as the command Colors. . .. When the user chooses that option, the standard panel pops up.

The Colors panel provides seven different ways to specify a color. The chosen color appears in the color well on the right side of the Colors panel, ready to be grabbed from there and dropped into an image in the application or stored as part of a custom palette in the grid of color wells at the bottom of the panel. In any mode, you can drag within the color selector or use sliders to see the color change interactively in the color well.



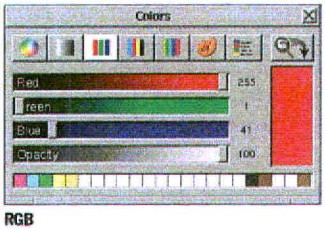
Color wheel

You select a color with the color wheel by clicking the mouse on any part of the wheel. Colors change in hue as you move around the wheel and get more saturated as you move from the center to the edges. Once you've chosen a color, you can move the slider to the wheel's right to make the color darker (add black).



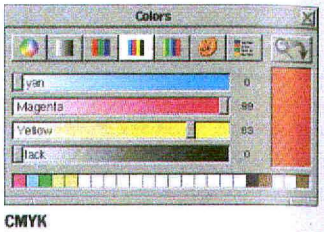
Grayscale

The second Colors panel mode lets you choose among shades of gray. This mode provides two sliders: one to specify the shade of gray, the other to select opacity. A set of buttons between the two sliders lets you choose from a variety of grayscale presets.



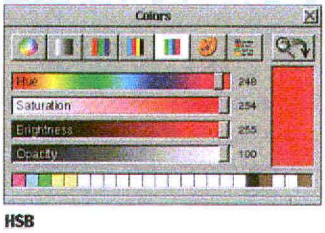
RGB

You specify RGB colors with a slider for each color (red, green, and blue) and a fourth for opacity. RGB is the model used to display colors on color monitors and is a common model in use for color graphics.



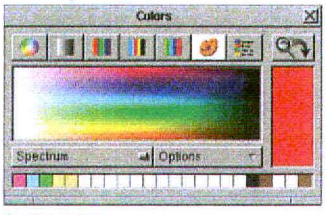
CMYK

Publication designers would likely use the CMYK (cyan, magenta, yellow, black) mode, which specifies colors according to the system used by commercial printers. The CMYK mode of the Colors panel provides sliders for specifying amounts of each "ink."



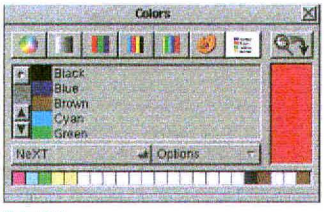
HSB

HSB (hue, saturation, and brightness) is a color model commonly used for video work. The HSB mode in the Colors panel works like a combination of the color wheel and the RGB sliders. Of the four sliders, one controls hue (the position on the wheel), the second controls saturation (the distance from the wheel's center), the third controls brightness (the amount of black added to the color), and the fourth, opacity.



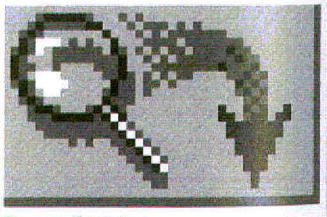
Custom palette

This mode displays a spectrum. As in the color wheel, you pick a color simply by clicking on part of the image. The difference is found in the pull-down Options menu: by choosing New or Open, you can place any TIFF file into the palette, enabling you to pick colors directly from that image. A pop-up menu lets you select among installed images.



Color list

The last mode provides a named list of colors. The basic list gives you black, blue, brown, cyan, green, magenta, orange, purple, red, and yellow. You can also create your own colors and install them there—especially useful if you're doing work with custom color inks (such as Pantone colors).



The magnifying glass

Clicking on the last button of the Colors panel produces a magnifying glass, which you can drag around the screen to pick up a color from any image displayed on the screen. When you grab a color with the magnifying glass, the color appears in the color well, and the controllers of the mode you're in automatically adjust to show the corresponding value of the color you've chosen.

Once colors are selected in the Colors panel, they can be dragged into any application by simply clicking on a color well in the Colors panel and dragging the color into a window on the screen or into another color well in an application. (When you drag a color, a little quarter-inch square of color follows the pointer on the screen.)

The Colors panel is impressive for its comprehensive, unifying approach to different color models. Its weaknesses reflect the current state of color technology. It unifies display colors, but that still leaves a big gap between colors you choose and colors that print. According to NeXT's Keith Ohlfs, designer of the Colors panel, the panel will include new technologies that will address the problem, such as the Calibrated RGB and CIE models, once they are adapted in PostScript Level II.

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[CONTINUED FROM PAGE 21]

The main criticism of NeXT's 16-bit color is that you can't get it by upgrading your NeXTcube or black-and-white NeXTstation. That's a serious gap in NeXT's customer service plan and blocks out a lot of potential customers.

For new buyers, though, the NeXTstation Color should be a strong contender for basic publishing, graphics, engineering, and everyday business work. If NeXT succeeds in getting its third-party developers to start cranking out applications, it could cut deeply into the other vendors' basic color markets.

Going upscale

The NeXTdimension system is a 68040 NeXTcube with a NeXTdimension board and the MegaPixel Color Display. Like the old Cube, the new one includes three NeXTbus slots, with various floppy, hard disk, and optical disk storage options. The NeXTdimension board plugs into one of the NeXTbus slots. You can turn any NeXTcube into a NeXTdimension with the addition of the board and the new display (if you have an '030 Cube, you also need the '040 upgrade).

The NeXTdimension board includes its own Intel i860 dedicated RISC processor running at 33MHz for graphics, 8MB to 32MB of main memory, and 4MB of display RAM. Its 32-bit color includes 8 bits of alpha channel and 24 bits of color descriptor (8 bits each for red, green, and blue), for a possible 16.7 million colors.

This level of color and resolution is ideal for graphic artists doing color pasteup work on the screen, or engineers working with very detailed, three-dimensional CAD drawings (or it will be, when CAD and other applications arrive). The NeXTdimension color display and imaging performance (as fast or faster than 2-bit monochrome) is about as good as you can get without spending a hefty five figures.

When announced last fall, one of the most exciting features of NeXTdimension was its built-in C-Cube image compression processor, which would enable real-time video-to-disk using JPEG. Unfortunately, design and manufacturing problems by C-Cube forced NeXT to ship the NeXTdimension, without this important capability. (Subsequently, C-Cube announced that the problems were solved and the chip would ship.) JPEG is provided only in software, which limits video performance to a maximum of about 15 frames per second.

At press time, NeXT had not decided how–or if–the hardware JPEG capability would eventually be provided and whether current NeXTdimension purchasers would get it later as a free upgrade. Current NeXTdimension boards ship with a connector that will allow a daughterboard with JPEG (or even the more efficient MPEG) hardware to piggyback on top.

Even without the JPEG chip, NeXTdimension still offers impressive video capabilities–S-Video inputs and outputs along with RCA-style composite video jacks that let you hook up and control external videodisc players, VCRs, still-video cameras, or camcorders. These video capabilities, in combination with NeXT's CD-quality sound, make the NeXTdimension a natural for multimedia work.

The NeXTdimension display refreshes at least as quickly as a monochrome display does. Connecting a laserdisc player or SVHS-C camcorder and displaying the image in real time in one window doesn't slow down other windows on the screen. If I could figure how to get my cable TV hookup to work with the NeXTdimension, I might never leave my office. The color rendering is that sharp and fast.

New displays

Both new color stations use the same monitor, the MegaPixel Color Display, which comes in 17-inch and 21-inch versions. Both sizes have the same 68MHz non-interlaced refresh rate of the monochrome display, along with its sharp, 92-pixel-per-inch resolution. The 21-inch MegaPixel Color Display offers 20 inches of viewable surface, with a slightly larger dot pitch (0.28mm compared to the 17-incher's 0.26mm). The overall resolution, though, remains the same at 1120 by 832 pixels, although the pixels per inch changes to 75. The 21-inch monitor is preferable, if you can afford it.

Even if you don't have a specific use for color, I think you'll find that the color display is easier on your eyes than a monochrome display (others may disagree). During my tests of a NeXTstation Color machine, I switched back and forth from the 17-inch color monitor to the 17-inch monochrome. Even though the monochrome monitor is clear, clean, and very viewable, the color display seemed easier on my eyes, especially for long-term viewing. It was also considerably less garish than the 8-bit mode of the SuperMac monitor with Spectrum 24 card that I use on my Mac IIfx.

With both color displays, the NeXTstation's sound features are ensconced in a separate Sound Box, rather than incorporated into the monitor itself (as it is in the monochrome monitor), so you can use a 68MHz color monitor of your own choice instead of a MegaPixel Color Display. Considering the convenience, good price, and excellent performance of the MegaPixel tube, though, why bother?

Daily work

The real test of any workstation, whether or not you use it for color, is how easy it is to live with. The sad fact is that, unless you expect to become a master of UNIX shell scripts and proprietary color models, most UNIX workstations just aren't that much fun. For my money, every workstation should be as easy, reliable, and predictable to use as a Mac IIci or fx running System 7.0.

And that's where the NeXT machines really shine. Both the NeXTstation Color and the NeXTdimension are almost as easy to learn and use as System 7.0 Macs. And NeXTstep 2.0 provides some important interface improvements that help it keep its state-of-the-art GUI lead even over the improved Finder 7.0. With Release 2.0 of the system software, NeXT cleaned up many of the interface mistakes it had made, while strapping on new features like integrated color support.

If you had to pick a computer for doing your daily word processing, drawing, and basic engineering work, I don't see how you could go wrong with a NeXTstation Color. Even if you'd do as I would, and fill it with megamemory and the biggest internal hard disk you could buy, you'd still be talking about less money than any comparably equipped UNIX workstation.

As for the NeXTdimension, the lack of JPEG hardware support may dim the excitement a little, but not enough to hide the fact that its graphics support technology is far ahead of the competition in that price range. Let's hope that NeXT–and the incentive provided by the hardware itself–lights a fire under developers.

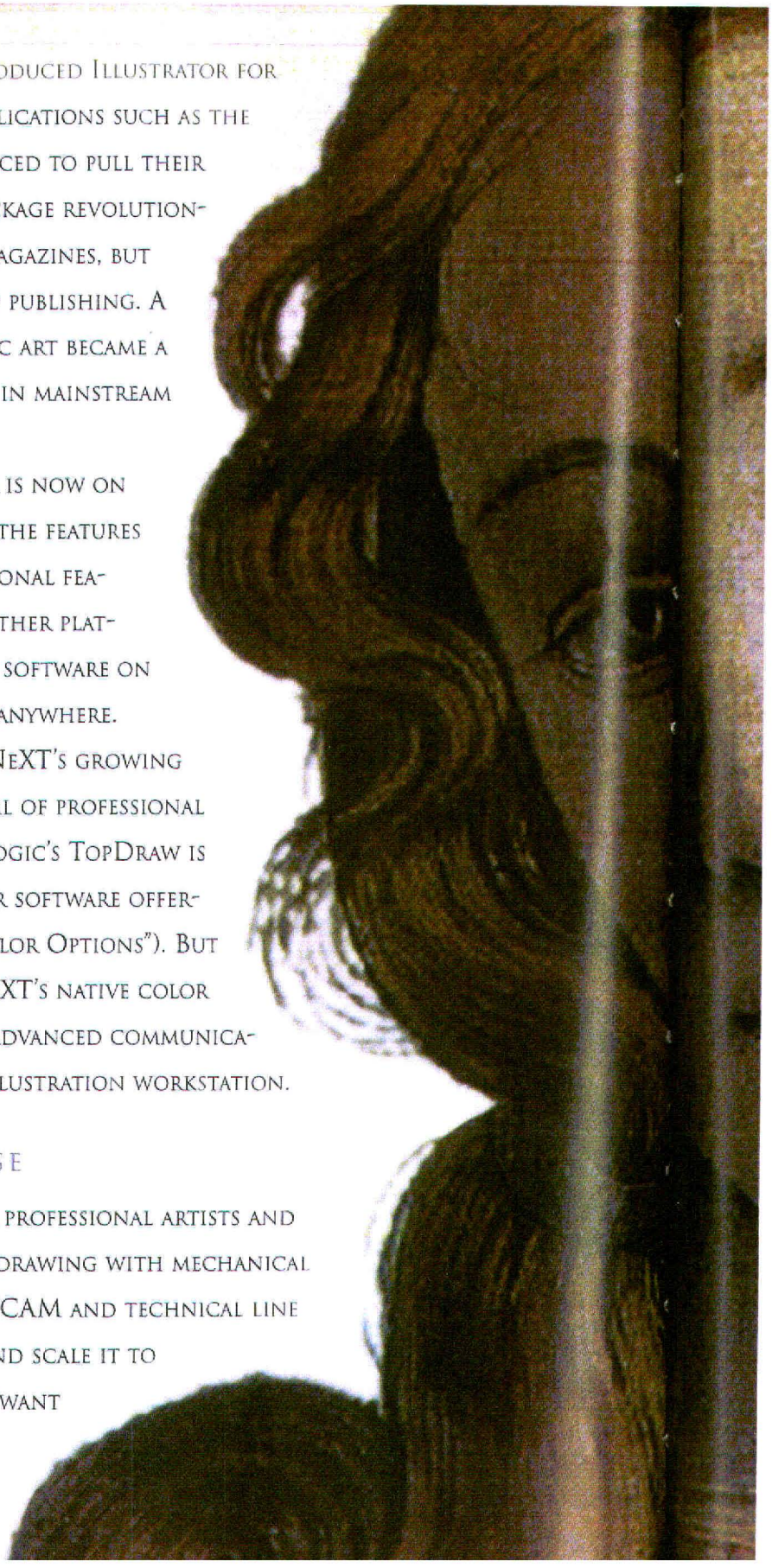
DON CRABB *is the director of laboratories and senior lecturer in computer science at the University of Chicago and a contributing editor for* NeXTWORLD.

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When Adobe introduced Illustrator for the Macintosh in 1987, art directors at publications such as the New York Times and Newsweek were convinced to pull their illustration work onto the desktop. The package revolutionized drawing, not only at newspapers and magazines, but anywhere illustrations were used in desktop publishing. A whole new genre grew around it: electronic art became a recognizable and popular illustration style in mainstream publications.

The latest version of Illustrator is now on the NeXT. Version 3.0 for the NeXT has all the features of Illustrator 3.0 on the Macintosh, additional features that will appear later in versions on other platforms, and benefits that can accrue only to software on the NeXT. In short, it's the best Illustrator anywhere.

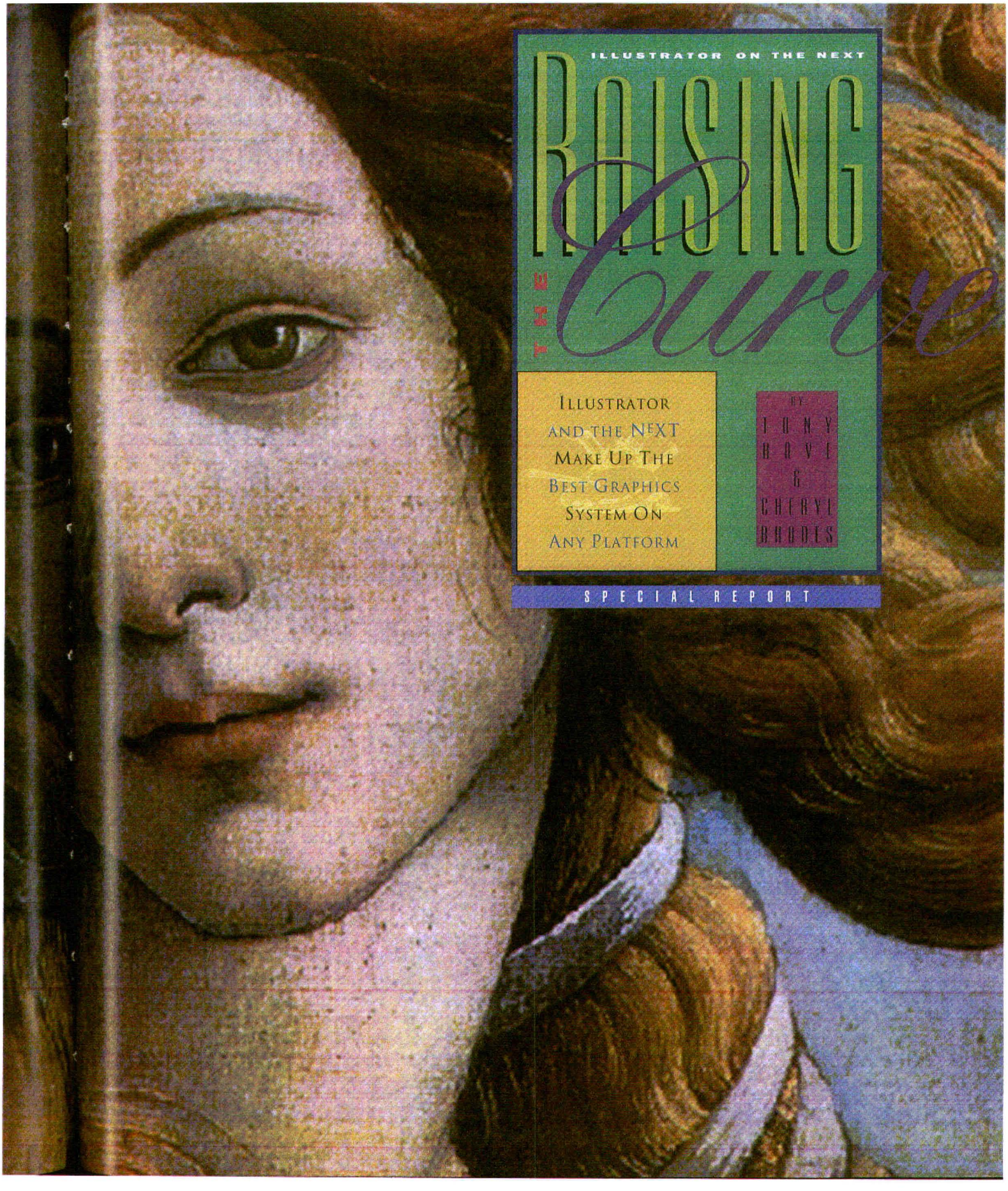
The addition of Illustrator to NeXT's growing palette of color software heralds the arrival of professional illustration tools to the platform. Media Logic's TopDraw is great for simple drawings, and sundry other software offerings enrich the tool set (see the sidebar "Color Options"). But the combination of Illlustrator and the NeXT's native color handling, Display PostScript imaging, and advanced communication features make the NeXT an impressive illustration workstation.



Drawing on Expertise

Adobe Illustrator is a comfortable tool for professional artists and illustrators because it uses the paradigm of drawing with mechanical tools. It is also an excellent tool for CAD/CAM and technical line art because you can draw a complex image and scale it to any size, yet preserve the line weights if you want (the lines will not get thicker when you enlarge the image). [continued on page 26]

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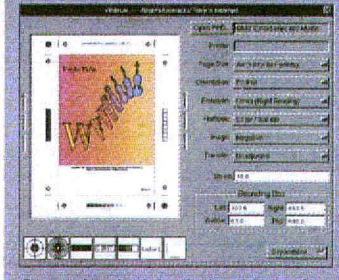


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Adobe Separator

Adobe Separator, a utility packaged with Adobe Illustrator, is as important to the NeXT in its own way as is Illustrator itself. Separator, which separates Illustrator files–or any other PostScript file–for color offset printing, represents a key software category for publishing and graphics applications.

Adobe Separator lets you print all of the process color separations (cyan, magenta, yellow, and black) in one operation–individually, as a color comp to a color printer, or as a comp translated to grays for a black-and-white printer. You can create separations for custom colors and Pantone colors for printing with custom inks (as one separation) or with tints of the four process colors.



Separator's main window displays the image for separation along with options for marking and printing.

The program offers options for four-color and custom separations, different page sizes, orientations (portrait or landscape), types of emulsion, and halftone-screen ruling (in lines per inch), and for positive or negative output.

Opening a file in Separator yields an image preview window that shows the artwork, with a dotted line representing the dimensions of the artwork's bounding box. The bounding box is defined in PostScript units (points), and represents the outside dimensions of an illustration (the smallest rectangle that could be dragged over all printable elements of the artwork). You can adjust this bounding box by dragging on the dotted line from any edge or corner.

Cross-hair register marks, trim marks, labels, color and gray bars, and star targets are provided as icons that can be dragged onto the preview image. These bars, targets, and marks are printed just outside the bounding box so that printers can align the pieces of film and position the image on the page. They are required by most print shops.

The Get Info command provdes information about the illustration's fonts, placed EPS images, patterns, and bounding box. This capsule is just what an image-setting service wants to know about any file you send them. You can print out the info box and send it with the file for output.

Separator allows you to specify a bleed area–a margin outside the printed area into which the image is extended, so that colors extend to the edge of a page when it is trimmed to the proper size. (Bleed can be used only if the bounding box of the image is smaller than the actual image.)

For some output devices you can specify a custom page size and an offset, to move the page away from the right edge of the printed sheet. The maximum page size depends on the resolution setting of the output device. For example, the Linotronic 300 can accommodate a larger page size when a lower resolution is specified.

A transfer function lets you adjust output tint values according to densitometer readings taken from the image setter. With appropriate settings, the transfer function helps ensure that the tint values in your separation will closely match the values originally assigned to the illustration.

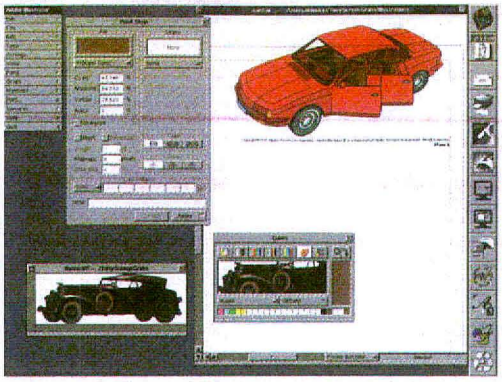
PostScript Printer Description (PPD) files for various printers and image setters ensure that separations are produced with the best possible control settings for each. The PPD device information includes the resolution, available page sizes, color support, and acceptable screen rulings for specific output devices.

Like the NeXT version of Illustrator, Separator has been thoroughly tested in its Macintosh incarnation and arrives on the NeXT platform ready for business and well known by prepress experts. The catch is, this key piece of software is only available with Illustrator. You'll have to buy the whole package to get your hands on this separation tool.

by TONY BOVE & CHERYL RHODES

[CONTINUED FROM PAGE 24]

Artists who like to start with rough sketches still can. Any scanned image–no matter how rough–can be brought into the program and turned instantly into line art using the automatic tracing feature.



Using the NeXT's color picker along with Illustrator's Paint Style panel makes it possible to sample a color from a TIFF or other open document and use it in your illustration.

Illustrator offers sophisticated curve-drawing tools to make curves of any shape and size and complements that set with myriad tools for adding patterns and colors. You can draw geometric or custom shapes or draw freehand, using a scanned image as a template. (The NeXT's is the only version that lets you use color TIFF images as templates.) The program offers automatic tracing over images as well.

You can display what you've drawn, display only the template, or display both the drawing and the template. The artwork view displays a "wire-frame" version of the illustration, for quick viewing and editing. You can see how the artwork will look when printed, including line weights and color, by choosing the preview mode. You can even quickly preview a selection rather than the entire illustration. A long-awaited feature–currently available only on the NeXT–lets you edit the illustration in preview mode. (The NeXT's Display PostScript makes implementing this feature much easier than on other platforms.)

The NeXT version of Illustrator 3.0–unlike the Mac's–lets you place TIFF images inside the Illustrator document and automatically trace areas based on color values. Also currently unique to the NeXT version is the ability to view and automatically trace a color image as a template. You can limit the tracing to a certain color in the template, and you can set a color tolerance level (a percentage of the color you want the tracing feature to recognize) to trace only areas that are strongly colored.

COLOR PICKS

Color applications like Illustrator finally show the real advantages of NeXT's color picker (see the sidebar in "Color à la Mode" in "Primary Color" in this special report). You can use the color picker's magnifying glass tool to sample a color from a TIFF or any other image in any on-screen window, then add it to the color picker panel. The color is then available to assign to a path in the illustration.

Illustrator's color system lets you assign colors to illustrations either as CMYK or by specifying a Pantone color or custom color.

Adobe Illustrator 3.0

●●●●●

The NeXT version of Illustrator 3.0 adds features available on no other platform to the new page-layout and text features introduced with Illustrator 3.0 on the Macintosh. Along with Adobe Separator, included with the package, it brings professional-level illustration tools to the NeXT.

$695

Adobe Systems, 1585 Charleston Rd., Mountain View, CA 94039. 415/961-4400, 800/344-8335, 415/961-3769 fax

Illustrator supports Pantone Matching System (PMS) colors in the Paint Style panel. (NeXT is also negotiating with Pantone to license PMS colors for support at the system level, in which case they would be available to any application through the color picker. Until those negotiations are complete, however, they are available only within Illustrator.)

Color separation is provided by Adobe Separator, bundled with Illustrator 3.0 (see the sidebar). Illustrator can print to any PostScript color printer and its EPS (Encapsulated PostScript) format can be handled by any high-resolution imagesetter (see "Color In, Color Out" in this special report for more on printing color from the NeXT).

Illustrator's Blend tool creates blend steps from one shape and color into another; or you can use Blend with colors alone to achieve an airbrush effect.

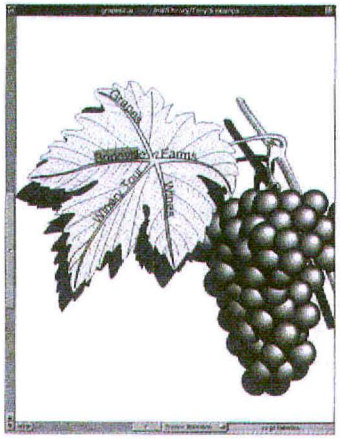
OBJECT LESSONS

Keyboard controls make the program easy to use for drawing precise curves and shapes. You can switch from one drawing tool to another quickly, or bring up a panel for entering exact specifications for an operation, using combinations of the mouse button, the Alternate key, the Command key, the Shift key, and the space bar. You don't always have to go back to the tool palette–you can keep your eyes and hands on the artwork. Once you learn the tricks, you can draw complex images quickly.

There are several useful ways to select entire objects and pieces of objects, or just points within them. You can use rulers or other objects as guides for accurate drawing. On the NeXT version only, a grid feature enables you to accurately align objects. You can set the spacing of the grid and display the grid in front of or behind the artwork. Anchor points can snap to all grid lines, just the horizontal or vertical lines, or just the intersections. Grid settings are saved with the document.

When scaling an object or group, you can choose uniform or constrained scaling, which preserve line weights or scale the lines, respectively. Grayscale shading, when enlarged or reduced, retains its exact density because it is repainted with the specified shading percentage.

Illustrator 3.0 adds full typographical control over kerning and spacing, hanging punctuation, indentation, and the horizontal scaling of characters. You can specify the color and thickness of the stroke and fill characters with colors or shades of gray. The Rotation tool rotates text by any specified percentage, or you can rotate text freehand, with the mouse. You can select and scale text and graphics together, because both are treated as graphics. Text is always editable with the Text tool.



Version 3.0's new type-manipulation features let you place text along a path. You can edit the text even after styling and placing it.

Type 1 PostScript typefaces can be used to create outlines of characters that can be edited just like other paths and modified to create logos, display type, or a variety of special effects.

Text can be styled with differ-

Color Options

Adobe's Illustrator and Separator applications join a growing list of programs that take advantage of NeXT color, including non-graphics applications that have graphics tools that work in color, and other programs that use color for other purposes, such as differentiating data in the interface. The list includes drawing tools, a spreadsheet, and single-purpose graphics tools that work with other programs to create a rich graphics environment.

You can tell a color-capable application by its icon: icons of programs that work with color display in color in the NeXT workspace.

Here's a rundown of the color-capable applications currently available and on the horizon.

Color Graphics Packages

Artisan 3.0 (Media Logic)
This image-retouching package is scheduled to ship this fall. The program, previously released on other UNIX platforms, will offer full-color retouching of TIFF images and supply color paint tools for image manipulation as well. The NeXT version promises to have the same functionality as the Sun (OpenLook) and SGI versions, but with a true NeXT interface, including support for the NeXT color picker.

Create!/TextArt (Stone Design)
Create! is a color PostScript paint program with lots of fun bonus features (see the review, *NeXTWORLD* January/February 1991). It lets you easily manage such special effects as "neon Beziers" and preview PostScript code before printing it. TextArt, the first graphics package from Stone Design, is a subset of Create! that offers the same fine drawing tools, but only in black and white.

Diagram! (Lighthouse Design)
Diagram!, a drawing package optimized for the quick building of charts and diagrams, supports full color. To draw, you simply drag elements off palettes. Clearly understandable inspectors and standard support for the NeXT color picker enhance its ease of use. The program is short on special effects and advanced techniques, but it provides basic tools in a package anyone can use.

"Stealth" (Altsys)
"Stealth" is the code name for an announced but as-yet unavailable color drawing program from Altsys Corporation, makers of Aldus' Freehand software for the Macintosh and DOS platforms. Those who have seen the progress on this package so far believe that Adobe will have some serious competition for their current spot as the NeXT color graphics leader. At press time, "Stealth" was looking toward a September or October 1991 release.

TopDraw 1.0 (Media Logic)
TopDraw 1.0 is a full-featured drawing package–the first available for the NeXT. TopDraw 1.0 was designed to function best with grayscale graphics and spot color, which it does admirably. Unfortunately, its user interface was established prior to some of the latest NeXT interface advances, so the program requires some getting used to, and it does not support the NeXT color picker. TopDraw 2.0 will support the new NeXT features when it ships toward the end of the year.

Non-Graphics Packages

FrameMaker 2.0D (Frame Technology)
FrameMaker is a full-featured document-layout tool aimed at publishers of long, structured documents (see the review in this issue). It includes its own set of graphics tools, but has no color graphics support, though it does have limited spot-color capabilities. FrameMaker has its own model for selecting and manipulating color–it offers no access to the NeXT's color picker.

HyperCube (Thoughtful Software)
HyperCube, due this fall or winter, is the NeXT's answer to the Macintosh's HyperCard, supporting color graphics as a central part of its tasks. The draw and paint palettes have a selection of simple, easy-to-use graphics tools. It includes basic color painting tools. The NeXT color picker serves to colorize any object you like. This package, however, does not easily export files in the usual graphics formats (EPS and TIFF) for publishing purposes.

Improv 1.0 (Lotus)
Improv (see the review, *NeXTWORLD* January/February 1991), is a new concept in presenting and manipulating numerical data disguised as a spreadsheet. Improv supports color in its whiz-bang charts and graphs.

Mathematica
Mathematica is one of the few programs that uses color as an integral part of its on-screen mission. Through exciting use of color, this complete system for doing, visualizing, and even hearing mathematics gives the user additional insights into the problem at hand.

Wingz 1.1 (Informix)
This is a very versatile, if somewhat quirky, spreadsheet application that includes drawing tools, a hypertext language, and desktop presentation tools, as well as stunning charts and graphs, on its color workbench. In fact, this broadly based application lets you use color for all sorts of purposes. On the down side, Wingz has declined to support System 2.0's interface guidelines, so does not support the color picker and other NeXT standards. Wingz's own color picker supports only RGB color, but it is easy to use and visual.

by RICK REYNOLDS

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ent typefaces, sizes, and colors and can be automatically arranged to fit a shape, follow a path, and wrap around graphical objects. Even after text is set along a path, it can be selected and edited. You can also import text into a rectangular area that can be linked to other rectangular areas (for example, text in columns).

The program lets you import text in ASCII and RTF (Rich Text Format) formats, but not WordPerfect or WriteNow files.

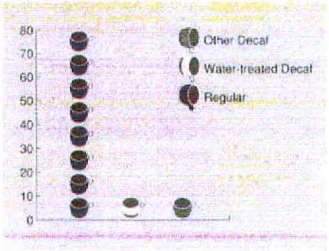
Illustrator's graph tools automatically create charts and graphs (grouped or stacked columns, line, pie, scatter, or area) from numerical data. Chart data can be imported from a spreadsheet or entered directly into Illustrator's own mini-spreadsheet window. Charts can incorporate imported PostScript objects or TIFF images in place of chart elements like bars or line markers. This set of tools can create illustrated infographics up to the standards of the glossiest news magazines.

Graphs are created as a set of grouped objects. As long as the objects remain grouped, you can change the graph type or style with options from the Graph menu. Once ungrouped, the objects can be altered in shape and transformed as you would any other object.

The NeXT Edge

The NeXT version of Adobe Illustrator 3.0 has all the features of Illustrator 3.0 on the Macintosh, plus features that are unique to the NeXT. Some of these features, based on NeXT technology, will remain unique to the platform even when other versions are upgraded.

- **Display PostScript allows you to view images exactly as they will be printed.**
- **An autotrace tool traces shades and hues in color images.**
- **Editing can be done in preview mode, so the effect ofchanges is immediately visible.**
- **You can import and display TIFF files, as well as EPS, and drag and drop those files into any Illustrator file.**
- **Detachable pull-down menus can be placed anywhere on the screen.**



A new charting feature lets you import TIFF or EPS images to use as chart elements.

In future versions, Adobe plans to add support for importing Improv spreadsheet data, and we hope they also include the ability to import Improv charts and graphs.

THE ILLUSTRATION STATION

Adobe has done a masterful job of maintaining cross-platform compatibility while taking specific advantage of the NeXT interface. For example, NeXT users will be happy to see NeXT's system of icon dragging supported in the NeXT Illustrator. You can drag an EPS graphics file into an Illustrator window and drop it to place it–a substitute for the Place Art command in the Macintosh version. Yet the NeXT version maintains all of the features–and more–of version 3.0 for the Macintosh. It is difficult to pull this off, but Adobe has risen to the occasion magnificently.

Illustrator conforms to the NeXT interface for command keyboard shortcuts and pop-up lists, while retaining all the functionality of the Mac 3.0 version. Illustrator fits right in with all the other NeXT programs. We particularly like the ability to show all the menus at once so that we can pick commands from them without dragging. Every NeXT machine has a decent-sized screen that can accommodate various windows, palettes, panels, and menus while providing enough room for drawing and previewing.

Some of the advantages that NeXT's Illustrator currently boasts over the Macintosh version will be lost when versions on other platforms are updated. Some advantages, however, are inherent in the platform and are here to stay.

Perhaps the key NeXT advantage is Display PostScript. The NeXT version of Illustrator lets you see an accurate version of your drawing, even at high magnification levels, without the distortion inherent in translating from screen-imaging to printer-imaging languages.

The NeXT platform supports the ability to copy and paste PostScript objects with other programs, to send PostScript pages to others via electronic mail, and to allow others to view EPS files without running Illustrator. Macintosh users have to contend with at least two versions of the resolution-dependent PICT format to view pages without Illustrator.

Performance is another difference. The NeXTstation Color runs faster on some tasks than a higher-priced Macintosh IIfx configuration. When we moved Illustrator's preview window around the NeXT's screen, there was no redraw lag. (This is true for the '040 machines, but not the '030s. We don't recommend an '030-based NeXT machine for graphics work.)

The NeXT's sophisticated color picker, electronic mail service with audio support, EPS previewer, library services, and font management all enhance Illustrator significantly. An ad agency, for example, can work up a design for an ad page, e-mail it to a client who sees an exact replica (including the proper font and color) without having a copy of Illustrator, and receive from the client a voice-annotated version of the page for corrections. NeXT's built-in Ethernet connections make the NeXT attractive for large art departments that need to move images around the network.

Did we mention the PostScript fax capabilities of the NeXT computer (using Display PostScript and the built-in digital signal processor)? This capability alone makes the NeXT attractive for publishing and graphic arts work. Images can be sent via fax, in PostScript form, to be printed out on a high-resolution PostScript device (such as an image setter or platemaker) at another site. The PostScript format guards the quality of the images.

PICTURE PERFECT

After reviewing the benefits, we thought the picture was too good to be true: there must be something we could find that tarnishes Illustrator's reputation as the best drawing program for the NeXT machine, or that exposes dirty laundry in the NeXT system. Our only significant concern is the lack of an on-line help system. With the exception of that and a few nit-picks, though there's nothing wrong with this picture.

Illustrator's features–precise drawing and transformation tools, automatic tracing, scaling with line-weight preservation, automatic graphing, precise typographic control over text with special effects (like using a path as a baseline), and resolution-independent images–are irresistible for professional artwork and illustration. Our only wish is that a future version will offer the ability to use anti-aliasing techniques to blend illustrations within TIFF images. The NeXT computer has enough horsepower to do it, so we can expect future enhancements to Illustrator to be even more exciting.

TONY BOVE AND CHERYL RHODES *publish the* Bove & Rhodes Inside Report *on desktop publishing and multimedia.*

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COLOR IN

COLOR OUT

Support for standards gives NeXT a leg up with generic color peripherals.

by DAN LAVIN

Aside from enhancing the user interface, color on a computer has little use in and of itself. It can sharpen the distinction between layers in CAD drawings or make the red ink in debit columns in corporate worksheets more startling.

But to really make use of color, you need peripheral devices that digitize analog images for your computer and translate them back into a visual form for publication, business presentation, or full-scale multimedia show.

▼

NeXT's use of industry standards–SCSI, PostScript, and TIFF–theoretically enables any device that supports those standards to feed information into the NeXT and accept its output. Attach any device, hit Scan, Print, or Capture, and it should just work.

▼

But is it really that easy? To find out, *NeXTWORLD* hooked up a sampling of non-NeXT color peripherals–scanners, video frame grabbers, printers, slide recorders, and video output devices. Along the way, we learned quite a bit about the ins and outs of NeXT color.

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SCANNERS

The world of full-color original images is fair game for your computer creations, thanks to color input hardware. Scanners and video frame grabbers create bitmapped files from any type of original. Unfortunately, the choice of third-party devices for bringing color into your NeXT computer is fairly limited.

Because the NeXT includes no general facilities for scanning (as it does for printing), the interface to the hardware must be supplied by a third party. To date, only one color scanner, HSD's Scan-X Color (see the sidebar "One of a Kind"), will work with NeXT systems.

This may change in the near future. A wide variety of color scanners is available for the Macintosh that can physically connect to the NeXT's SCSI port. Rumor has it that an independent developer is working on generic drivers for a number of the leading scanners. Since it appears probable that a variety of color scanners will eventually be available, we will discuss them generically.

Flatbed scanners can scan anything that you can put flat on the glass, from photos to fabric. Other feed options include sheet-fed (which limits you to paper of certain sizes) or, at the high end, cylinder-fed. Slide scanners like the BarneyScan can read transparent originals.

Color scanners create RGB TIFF files by sampling each color separately. This can be done either by three separate scanning heads, in one pass, or by three passes of a single scanning head. The scanner software composites the image. Some scanner software even offers to turn grayscale scanners into color scanners by cleverly supplying filtering film, which the user places on the scanner's reading surface for each pass. Single-pass scanners guarantee the best color registration, since there is less chance that the orginal will move between readings.

Commercially available scanners generally have resolutions ranging from 50 to 300 dpi, selectable by the user, and color qualities from 2 bits of information (four colors) to 24 bits (16-million-plus colors) per pixel, also user-selectable. Keep in mind that bitmapped color data is huge, and the higher the image quality, the larger the file. A 300-dpi image in 24-bit color can have almost photographic realism, but a full-page version will be 24MB.

For high-quality publication work or output to slides, you'll want to use the highest resolution that your scanner–and your storage system–supports. For images that will be used only on-screen, choosing a resolution above 92 dpi (the resolution of the NeXT screen) is wasteful. Likewise, the number of bits per pixel is likely to be limited by the capacity of your storage medium, but the rule here is that more is always better, up to 24 bits. For some publishing applications, however, storage will be more valuable than color quality.



One of a Kind

Luckily, even though there is only one scanner for the NeXT, it is excellent. HSD's Scan-X Color scanner is a 24-bit, flatbed, three-pass color scanner. It can scan fron 50 dpi to 300 dpi in color, as well as 8-bit grayscale up to 300 dpi, and single-bit (for line art) up to 1500 dpi. The HSD software provides a preview mode that allows you to select part of the image for scanning (this can save a lot of space on disk).

HSD claims that its software, along with special enhancements to the basic mechanism, make this the most accurate scanner on the market. The HSD scanner offers only one pixel-depth option for color: the full 24 bits.

HSD provides free technical support and a one-year warranty.

$2995. HSD, 1350 Pear Ave., Ste. C, Mountain View, CA 94943. 415/964-1400, 415/964-1538 fax



Video for All

A color version of Metaresearch's Digital Eye, which has been shipping for some time, Color Digital Eye is a small box that connects to the DSP port of any '040 NeXT. At press time, Metaresearch expected a July release date. Color Digital Eye doesn't have the horsepower of the NeXTdimension, but it does have the same Philips image-processing chip set.

The system's ColorSnapshot software controls the input, getting around the problems caused by full-motion video data size in an ingenious way: It captures many frames per second, but only in a small window; you trade a high sampling rate for a smaller image and some video information. It can capture a full 30 frames per second at 114 by 85 pixels, 10 frames per second at 197 by 148, to 1 frame per second at 625 by 429 pixels.

One-year warranty; full tech support is available.

$1195. Metaresearch, 516 SE Morrison, Ste. M1, Portland, OR 97214. 503/238-5728

DIGITIZING VIDEO

NeXTdimension will accept a video signal from anything that produces video output, including any standard VCR, camcorder, or laserdisc. The signal is digitized by NeXTdimension's built-in video circuitry. Other NeXTs can use Color Digital Eye from Metaresearch (see the sidebar "Video for All"), a hardware/software system that sits between a video camera or video player and the NeXT.

The big problem with video is once again the size of the data. Video signals in the U.S. and Asia follow the NTSC video standard, which produces an image resolution of 640 by 480 pixels, with roughly 15 bits per pixel. A different standard, PAL, is used in Europe. NeXTdimension and Color Digital Eye convert either standard to 24 bits per pixel, and each frame of color video information is about 7MB in size.

Full-motion video requires 30 frames per second. That kind of input can make for severe bottlenecks as the system attempts to store the data, so computer systems use a compression algorithm to manage the flood. While NeXTstep Release 2.0 provides JPEG compression in software, the lack of a compression chip in the hardware (see "Primary Color" in this special report) imposes a limit of from a few to perhaps 12 frames per second, depending on the amount of memory in your system.

COLOR OUT

On other platforms, the computer's native imaging model is translated by a printer driver into the printer's imaging model. Because the NeXT uses PostScript for both internal (on-screen) and external imaging, the time-consuming interpretation process is bypassed. Also, since any PostScript printer can read its native format, the full range of PostScritpt output devices on the market, from slide recorders to color printers, will work with NeXT systems.

One benefit of PostScript is that each output device interprets a PostScript description to the best of its abilities. That is, if the device is capable of 2500 dpi, the file will be output at 2500 dpi; likewise, if the device outputs single-bit black-and-white or 32-bit color. A color image can even be displayed on a black-and-white machine and printed from there to a color printer, with all its information intact.

PostScript's device independence trips up in one area. You can print a color PostScript image to a NeXT black-and-white printer but not to generic black-and-white printers. The situation will be solved when PostScript Level II black-and-white printers come on the market. Meanwhile, though, the Display

PostScript code extensions that enable NeXT's color are limited to color devices.

PostScript also yields benefits in working with bitmapped images. Although such images top out at the resolution they start with (if the image was scanned at 300 dpi, that's the maximum quality of the output), PostScript scales and dithers bitmaps to match the higher or lower resolution of the output device. When going to a device with higher resolution, new dots will be interpolated to allow the image to scale up gracefully.

The only problem with NeXT's fidelity to the PostScript standard is that less-expensive color technologies like the $1000, low-resolution HP PaintJet printer won't work with NeXT. (In a few special cases, non-PostScript devices can run custom PostScript drivers, but it's a rare exception.) The entry level starts at $7000 for thermal wax technology.

PRINTERS

No PostScript printer manufacturer has released a model specifically for the NeXT, but several claim that their Macintosh models can be used with the machine (see the sidebar "A Spectrum of Printers"). *NeXTWORLD* tests showed the claims to be true; the top color models worked flawlessly. There were only two problems.

First, speed. Unlike NeXT's own printer, which connects to the system's printer port, third-party devices must use a serial connection, which slows data flow by a factor of 500. In practical terms, that means a full-page Illustrator image sent to a non-NeXT color printer could take about four minutes to print. Optionally, you can tie the printers into your Ethernet network using an AppleTalk router like Cayman's GatorBox. Although that's an additional investment of $3000 to $5000 and lots of system administration time, print speeds are several times faster than through the serial port. It is probably worth the cost if you'll be doing a lot of color printing.

The second limitation is the lack of full support of the Print panel options. NeXT's system software includes Adobe's printer description files for 60 printers, but it does not make use of the information in these files. This means that users cannot control the resolution and paper feed options (regulated by printer commands rather than PostScript code) unless the application software provides the support.

The two paramount color printing technologies are thermal wax and color laser. Thermal wax works like a four-color printing process, building up images through successive applications of dots of different colors: either cyan, magenta, and yellow, or cyan, magenta, yellow, and black (for greater richness). Here, though, the dots are of wax instead of ink. The effective resolution for a 300-dpi printer using this technology is actually 150 to 200 dpi, due to the spreading of the wax dots on the paper.

The thermal wax process uses a hot print head to melt small dots of ink from polyester sheets covered with ink (one for each color) onto either paper or transparency film. The wax sheets feel like Saran Wrap, with all the problems of handling Saran Wrap (although the sheets are much more durable than they seem, and we encountered no actual problems installing them). The process requires a full sheet of wax ink for every color of every image, regardless of the amount actually used. Each roll holds enough sheets for between 100 and 250 impressions. This, plus the fact that this type of printing requires special paper or film, makes for an expensive technology. After paying $6000 to $10,000 for the printer, expect to pay about 50 cents a print for paper and $1.50 for transparencies.

At press time, an exciting alternative was emerging. Tektronix was planning a June 18 announcement of a new color printer using phase-change ink-jet technology. Instead of wax sheets, Tek's phase-change printer uses melted reservoirs of CMYK (cyan, magenta, yellow, black) inks that harden when they hit the paper. This technology requires only the amount of ink needed to produce a given image, with no wasting of ink sheets. This also enables you to econmically use the printer for printing the occasional page of plain black text.

Further, it's a plain paper technology, meaning that, within certain tolerances, it will print on anything, from letterhead to burlap. A page of black text on this printer costs 5 cents, color is about 25 cents per page for the average sheet with 30 percent coverage (These costs don't include the nominal cost of plain paper.) Pages with denser coverage cost slightly more.

In general, the quality of phase-change output is also higher than thermal wax. The registration of the indivdual dots of ink is much better than with thermal wax, and the prints are more scratch-resistant. And because the printer cost ($9995) is only slightly higher than for thermal wax printers, it seems likely that phase-change ink-jet printers will become the preferred technology.

Canon's color laser copying technology is the premiere color alternative. Canon and other vendors supply controllers that turn Canon Color Laser Copiers into color printers capable of creating either dithered or continuous-tone CYMK output at 400 dpi. Unfortunately, the price of such high quality is steep. The copier itself runs $50,000, and the controllers that turn it into a printer cost another $30,000 to $40,000.

Print to Film

Agfa has announced four models (the ProColor Premier, the Slidewriter, the QCRZ, and the Forte) for use with the NeXT. They allow production not only of slides but, with special attachments, also Chromalins. Agfa uses Adobe PostScript and provides a whopping 73 fonts. These devices are extremely expensive, but produce the highest-quality color output available on the NeXT.

The Agfa recorders also provide the ability to do rudimentary color correction; trial-and-error tweaking can be done on the device itself. We were not able to use the recorders in-house for this article, but they have been used successfully at NeXT Computer.

Agfa provides toll-free technical support and a 90-day warranty.

Slide Recorders $7000–$32,000, ChromaScript PostScript option (required) $17,000. Agfa Corporation, 1 Ramland Road, Orangeburg, NY 10962. 800/288-4039

A Spectrum of Printers

In order to confirm the claim that any PostScript color printer should work with the NeXT, *NeXTWORLD* tested five of the best-selling PostScript printers released for other platforms. Within the limitations concerning speed and non-PostScript support mentioned in the article, they all worked well. Although we hit some glitches while installing the devices, the slight problems were worth the effort to get color prints off the NeXT.



Océ Model G5241-PS

This is the sleekest and best looking of these printers. The Océ is the highest-priced printer we tested but also claims the highest-rated engine life. It provides 8MB of memory and 35 Adobe PostScript fonts, and it supports legal and letter sizes.

Setup is easy on this one, with a clear configuration panel. Colors on the Océ are bold and strong.

Océ provides technical support and a one-year warranty.

$8990. Océ Graphics USA, 385 Ravendale Drive, Mountain View, CA 94039. 800/545-5445

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NEC Colormate PS Model 40/80

NEC's Model 40 is the lowest-priced printer we tested. The tradeoff is that you get only 17 fonts and 4MB of RAM. The Model 80 provides a more standard 35 fonts and 8MB of memory, and it handles legal-sized paper. Both models use true Adobe PostScript. The colors on the NEC are somewhat subdued and grainy compared to the other machines.

We like the unique top-loading paper hopper on this machine. NEC also deals best with the Saran Wrap problem: its rolls come partially enclosed in cartridges. Documentation is clear and copious. We also appreciate having a front panel with an LCD readout.

NEC provides toll-free technical support and a one-year warranty.

Model 40 $6995; Model 80 $8995. NEC Technologies, 1414 Massachusetts Ave., Boxborough, MA 01719. 800/632-4636



Seiko Colormate PS Model 4

The Seiko is the smallest machine we tested and comes with the most fonts (39). It's also among the lowest-priced. It comes with 6MB of memory and the PhoenixPage PostScript clone. Seiko's colors are well saturated, but registration seems less sharp than on the other machines.

Installation is made easier by an easy-to-use configuration panel–and harder by the need for a non-standard cable (not included). Seiko's paper comes on a roll, making it easy to switch from letter to legal size. It's a handicap when you want to switch to transparencies, but makes the cost per transparency significantly lower than for other printers.

Seiko provides 90-day on-site service and phone-in technical support.

$6999. Seiko Instruments USA, 1130 Ringwood Court, San Jose, CA 95131. 408/922-5800

SLIDES & VIDEO

Another type of PostScript output device is the slide recorder, which translates information from a color file into an RGB composite image that is output to photographic film for use in computer-generated presentation graphics. Because a slide recorder package includes an internal CRT, a 35mm camera, and complex software, it is expensive, ranging from $10,000 for moderate quality to $35,000 at the highest end.

The only slide recorders specifically announced for the NeXT are those from Agfa (see the sidebar "Print to Film"), but here, as with PostScript printers, any PostScript film recorder should work. The limitations on non-NeXT film recorders are the same as for printers: the serial hookup is slow, and non-PostScript commands are not supported by NeXT's operating system.

Slide recorders offer high resolution–35mm film has so many dots that it is almost an analog medium. They also provide the best color quality. The quality of the output depends on the quality of the recorder's internal CRT.

The last type of color output is video-out, in which computer-generated images converted to analog video signals for storage or display on video peripherals. NeXTdimension supports video-out in both NTSC and PAL formats. It can also record to a variety of media, including VHS, VHS-S, and Hi-8. For animation, NeXTdimension supports frame-by-frame output. An unheralded use of NeXTdimension's video-out is as a simple projection: direct composite output comes right out the back of the machine. For the time being, no other video-out options are available for the NeXT.

THE INS AND OUTS

Thanks to its support of standard technologies, the NeXT's color I/O options are far greater than one would otherwise expect for a new platform. With the exception of scanners, the NeXT's options for all types of color digitizing and output are on a par with the Mac's and PC's, and no other platform can match the video options of the NeXTdimension. Some setup is required, but the important fact is that a lack of hardware won't stop you from setting up a color shop.

The pieces are in place, but the wish list is still long. Although the NeXT's scanner offering is a good one, some competition would be welcome. Scanner drivers shouldn't be hard to put into place and are an easy first step to broader choices. Built-in support for AppleTalk and other protocols–or better yet, direct support for the NeXT from more vendors–would make color printing more accessible. Video compression on a chip is still necessary before video manipulation will rise to its real promise. But as these technologies appear, the NeXT's ability to handle the large data streams that they produce, its horsepower, and its unified imaging model will be real strengths.

DAN LAVIN *is a Senior Editor at* NeXTWORLD. His skin color: cyan 26, magenta 33, yellow 66, black 2.



QMS ColorScript 100

The QMS ColorScript 100 includes 35 fonts and 5MB of memory. It's among the easiest of the printrs to use, thanks to the fact that each color roll is placed in a separate tray outside the machine, reducing installation gymnastics. The front configuration panel has touch-sensitive switches (which, however, limit your ability to make sophisticatd configuration choices). The PostScript is true Adobe and the documentation is clear and complete. The QMS boasts a large image size and separate inks for business presentations and color-proofing applications. The proofing colors that we tested were subdued and slightly washed out.

QMS provides tech support and a one-year warranty.

$8995. QMS, One Magnum Pass, Mobile, AL 36689. 800/631-2692



Tektronix Phaser II PX

This printer represents the midrange in price. It has the best documentation of any of the printers we saw, full of clear, concise detail. Installation is fairly easy, though it has no configuration panel (available on the upscale DX). It uses its own version of PostScript and has 6MB of memory. It supports letter- and legal-sized output.

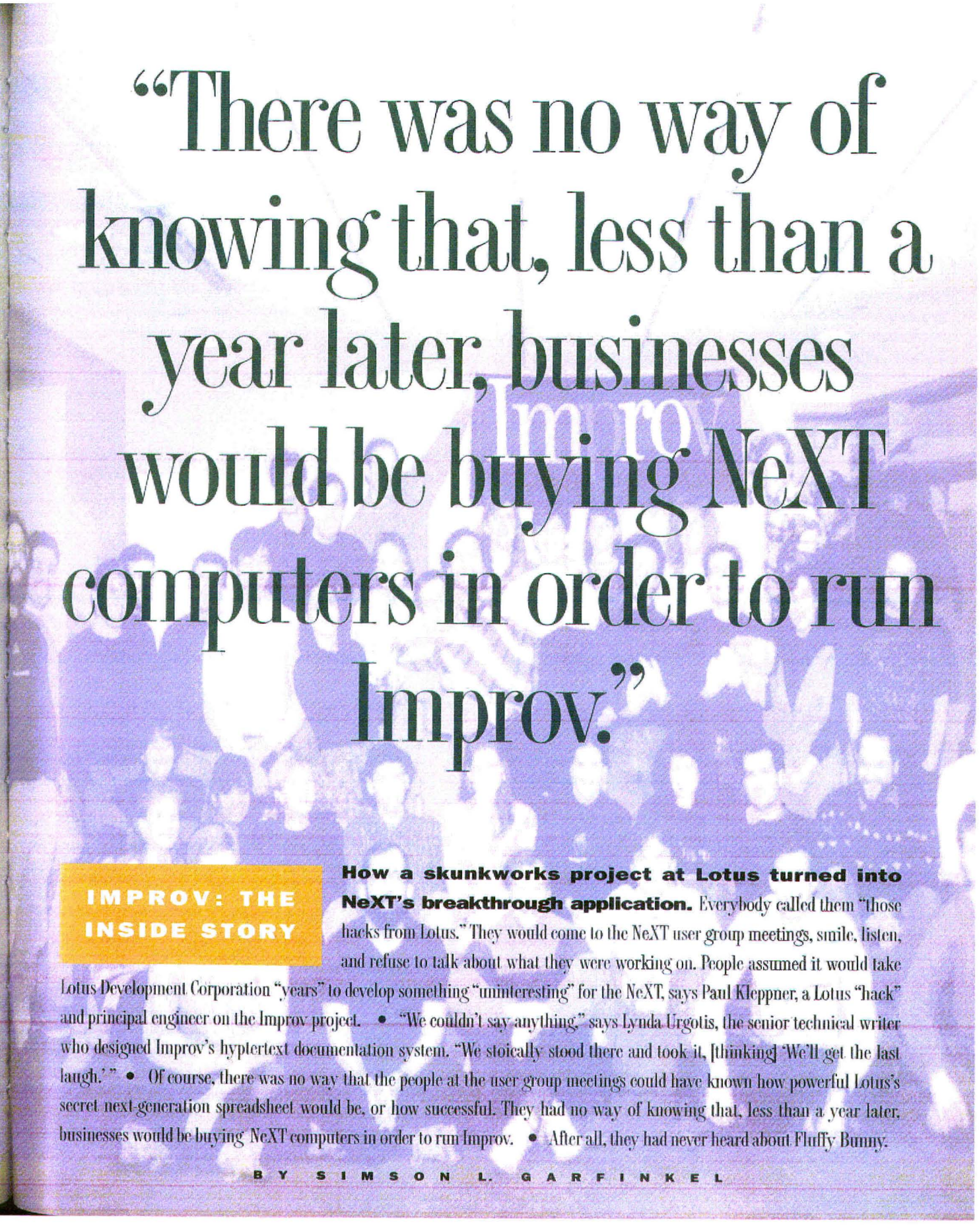
Colors are stong and bright–the most impressive of all our tested units. In fact, some users might feel that they are too cartoony and bright for some business uses.

Tektronix provides a one-year warranty and toll-free technical support.

$7995. Tektronix, P.O. Box 1000, Mailstop 63-583, Wilsonville, OR 97070. 800/835-6100

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"There was no way of knowing that, less than a year later, businesses would be buying NeXT computers in order to run Improv."



IMPROV: THE INSIDE STORY

How a skunkworks project at Lotus turned into NeXT's breakthrough application. Everybody called them "those hacks from Lotus." They would come to the NeXT user group meetings, smile, listen, and refuse to talk about what they were working on. People assumed it would take Lotus Development Corporation "years" to develop something "uninteresting" for the NeXT, says Paul Kleppner, a Lotus "hack" and principal engineer on the Improv project. • "We couldn't say anything," says Lynda Urgotis, the senior technical writer who designed Improv's hyptertext documentation system. "We stoically stood there and took it, [thinking] 'We'll get the last laugh.'" • Of course, there was no way that the people at the user group meetings could have known how powerful Lotus's secret next-generation spreadsheet would be, or how successful. They had no way of knowing that, less than a year later, businesses would be buying NeXT computers in order to run Improv. • After all, they had never heard about Fluffy Bunny.

BY SIMSON L. GARFINKEL

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Next generation

The idea that eventually grew into Improv started in 1986, when Lotus Development Corporation took an empty library on the first floor of its building at 161 First Street in Cambridge, Massachusetts, and set up the Advanced Technology Group (ATG).

ATG's charter was to come up with new ideas that Lotus might be able to turn into products. There were three projects and three researchers: a new development environment, an artificial intelligence system that never panned out, and "Modeler"–the seed of Improv.

One of the hardest things about using a computerized spreadsheet like Lotus's 1-2-3 is laying out the initial model: How to arrange the rows? The columns? It is simple enough to start entering numbers and formulas in cells; it is another thing entirely to create a structure that you can grow with.

Enter Pito Salas, a bright developer in the ATG. Salas studied a variety of complicated models that had been built with conventional spreadsheets and discovered that most of them employed a few basic patterns. If a spreadsheet program could be taught to understand those patterns, he realized, it would be much easier to use.

Within a few months, Salas had come up with the fundamental idea at the core of Improv: that the raw data in a spreadsheet, the way that the user views the data, and the formulas used to perform calculations can all be separated from one another. The formulas should be general, so that the user can type something like, "PROFIT = PRICE - COST" and have the spreadsheet calculate every PROFIT cell from its corresponding PRICE and COST cells. The user should be able to rearrange the views to highlight the relevant information and relations. The data itself should be stored in a multidimensional data structure. A slick interface should sit on top, to make it easy to get information in and out.

By the end of the summer, Salas had a demonstration program working on an IBM PC. It was really more a slide show than a computer program, admits Salas: The math was all faked. The project stalled at this phase until February 1987, when Salas hired Glenn Edelson, a hot programmer whose job it was to take Salas's ideas for general formulas and see if they could be implemented in C++.

"I had described all those [ideas] with hand waving," recalls Salas. "I had no clue how to build it. Glenn came in and we started working."

Things clicked. It soon became obvious that the technology for calculating general formulas could work and that multidimensionality was a powerful way to model complicated financial problems. In the spring of 1987, Salas hired Bonnie Sullivan to write a specification for the project and Jeff Anderholm to see if there was really a market need for a "high-end financial modeling application."

That summer, Modeler went on tour. The "road show," as Salas called it, took the Modeler demo program to six of Lotus's key customer accounts. At each stop they spent a day with a few analysts who did high-end financial modeling.

"We had a paradigm shift on that trip," recalls Salas. "It was really cool. We said that these ideas might be turned into a high-end financial modeling package of interest to perhaps ten percent of your company, and they said 'No, no, no! What you have is the next generation spreadsheet–something that will be used by half of our company!' "

Despite the enthusiastic comments, Lotus still took more than a year to decide to turn Salas's ideas into a product. The decision was finally made in September 1988 to go ahead with the "Back Bay" project (named after a Boston neighborhood known for its townhouses, boutiques, and restaurants). After experimenting with interfaces and a database engine under DOS and the Macintosh operating system, the group decided that the product would be based on OS/2 and Microsoft's Presentation Manager. They even picked a mascot–Fluffy Bunny–and started up an underground newsletter, "Fluffy Bunny Goes to Back Bay."

> "We thought we had a high-end financial modeling package, but customers said, 'No. It's the next-generation spreadsheet.' "

Green light

A month later, in October, Steve Jobs came to Lotus to show off his new computer. After the talk, Lotus's top management gave Jobs a private show-and-tell of their most interesting products then under development.

Salas showed Jobs a clunky, character-based spreadsheet, but all of the future elements were thereFormulas were entered at the bottom of the spreadsheet rather than integrated into the cells; it was multidimensional; and the user could instantly call up different views of the same data set.

Immediately, Jobs wanted Back Bay for the NeXT.

"He kept getting more excited. He was the most excited person in the room," remembers Salas.

Back Bay fit right in with Jobs's vision, says Allen Olsen, ATG's development manager. "Right from the start, he was looking for something new. It might have been better financially for his company to get 1-2-3, but that would have compromised his vision. [Back Bay] was attractive because it was a new kind of spreadsheet."

Likewise, the Back Bay group was excited by the NeXT. But when Jobs went back to California, the Back Bay group continued working on the OS/2 product–or at least they tried. Writing applications for the buggy initial releases of OS/2 and

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Presentation Manager was no picnic. And the allure of Jobs's black cube kept creeping back into their minds.

The decision to switch Back Bay to the NeXT came four months later. Ed Belove, the vice president of advanced technology, left a Post-It stuck on Salas's computer: "Pito–Come see me as soon as you get back. This is very important.–Ed."

"I think that [Lotus CEO] Jim Manzi really believed in us," recalls Jobs. "When the Improv team recommended to proceed on the NeXT (after their failure on OS/2 and Presentation Manager), Jim gave the green light."

There were both marketing and technical reasons for moving Back Bay to the NeXT, says Frank King, vice president of Lotus's software business group. By putting Back Bay on a computer platform that couldn't run 1-2-3, Lotus wouldn't have the problem of explaining to customers which spreadsheet to use for which application. There wouldn't be any marketing conflicts with Lotus's cash cow.

But King also wanted his engineers to experiment with the NeXT development system. "I have a lot of respect for Steve and the technology he has developed," says King. "I wanted to see if the things he was saying about NeXTstep were true."

The switch also gave the Back Bay group the freedom to rethink some of the basic ideas about the user interface. Rather than try to port the code written for Presentation Manager to the NeXT, the group resolved to rewrite the entire user interface from scratch. "We knew that we had a lot of work to do in the UI area, and it seemed that it was quick to do [on the NeXT]," recalls Olsen.

A few days after the decision, Steve Jobs sent a huge bouquet of flowers to Cambridge. "It was like he was wooing us," says Lynda. "It must have been three feet tall!"

Perhaps more important, NeXT sent technical wizard Bruce Blumberg to Lotus, where he gave the Back Bay developers a special one-week class.

Fluffy Bunny was off and running.

Direct manipulation

The best part about developing a user interface with Interface Builder wasn't the ability to design a single interface quickly; it was the ability to try out a lot of them. "It let us develop a lot of bad UIs," says Salas. "We could have an idea, and in an hour we would have it on the screen."

For example, an early version of Improv's Item Dispenser was simulated with Interface Builder and multiple windows. Other times, developers used the program merely as an electronic blackboard to sketch out ideas before writing the code to make the ideas work.

Perhaps the single most important and unique aspect of Improv's user interface is its Category Tiles, which the program uses to represent different dimensions of a multidimensional data set. But in January 1989, Back Bay didn't have Category Tiles. Instead, all of the view rearrangement was done with menu commands with names like Promote, Demote, and Perspective.

"It had all of these arbitrary restrictions," says Kleppner. Then the group hit upon the idea of using icons. "We realized that if we represented these things as icons, all these manipulations could be represented by moving icons from one place to another."

The Category Tiles also "broke through a lot of barriers in understanding for new users," says Salas. They let users visualize and directly manipulate the dimensions of the multidimensional database.

But where should the icons for the categories go? After trying a lot of different ideas, the developers decided to put them in their own window.

"And then Steve Jobs came," says Kleppner, remembering Jobs's visit in April 1989. "He said, 'Okay, who's the guy who came up with the picture? It's very important that he be here.' "

Jobs then said that the category manipulation had to be more direct. "You have to be able to touch the categories and move them around. Having them off in a separate window is too removed," Kleppner remembers Jobs saying. "He didn't even want to have the tiles; he wanted to just move them around. He's a fanatic for direct manipulation, and it really shows."

Jobs didn't have an answer, says Kleppner, but "one of the benefits of that [meeting] was that we junked the idea of the extra panel" and put the Category Tiles on the worksheet itself.

Conflict resolution

In a way, Jobs himself became an icon on the Improv development landscape. "He would come in periodically, tell us what he liked and what he didn't like," remembers Kleppner. "We didn't do everything he wanted, but he pushed us in the right direction a lot of the time."

For example, in one issue of "Fluffy Bunny Goes to Back Bay," Fluffy Bunny is warned: "Sometimes formulas are friendly, but sometimes they are Not Very Nice."

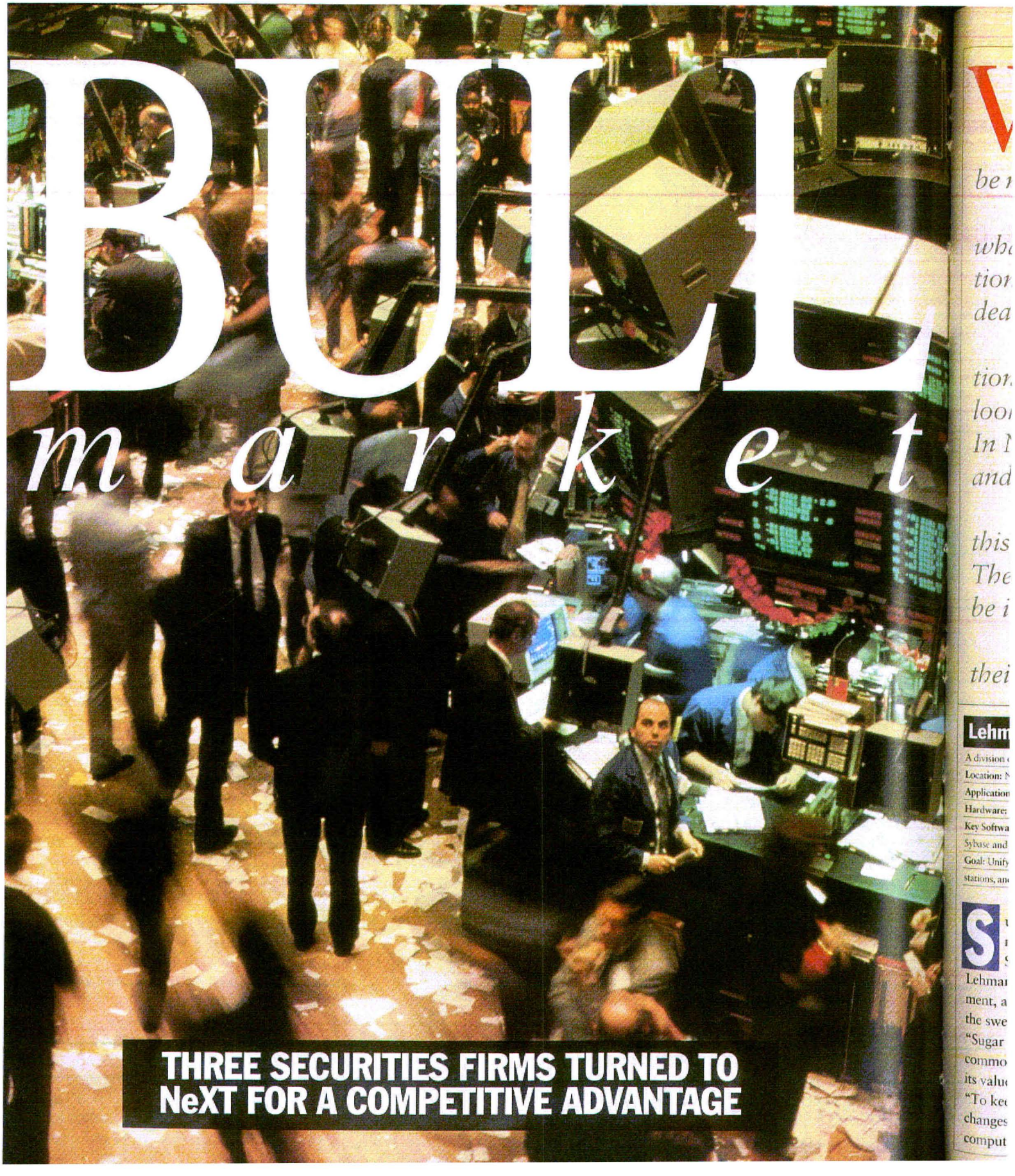
Formula conflicts were the problem. Since Improv has general formulas, it's possible that a single cell can be specified by more than one formula. A business's total profit over two years could be calculated either by subtracting the total price from the total cost or by summing the profits for each year.

The Back Bay group thought that the possibility of formula conflicts was a real weakness in the

[CONTINUED ON PAGE 79]

By putting Back Bay on a computer platform that couldn't run 1-2-3, Lotus avoided marketing conflicts with its cash cow.

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BULL *market*

THREE SECURITIES FIRMS TURNED TO NeXT FOR A COMPETITIVE ADVANTAGE

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Wall Street. Traders hovering over terminals and Teletype machines, telephones at every ear, eyes on the ticker. Few business environments demand more of people and machines. On The Street, decisions must be made instantly. Seconds make the difference between profit and loss.

Wall Street presents a golden opportunity to provide tangible evidence of what a NeXT system can do. It is the ideal professional workstation application, the proof of the pudding. "Everyone can understand computer usage that deals with money," says George Cummings, NeXT's New York sales manager.

Wall Street has been paying close attention to NeXT since the introduction of the 68040 NeXT last fall. Companies impressed by NeXTstep but looking for more processing speed have moved from evaluating to installing. In New York City, three financial firms already have significant installations, and another four are close behind.

This is the story of how three financial firms betting on NeXT are playing this high-stakes, high-technology game. Two are New York securities firms. The third is a Chicago options-trading firm. But while these companies may all be in similar lines of business, they chose NeXT for very different reasons.

The one thing they have in common is their goal of shaking a profit out of their investment in NeXT.

Lehman Brothers

A division of Shearson Lehman Brothers
Location: New York
Application: Sugar commodities trading
Hardware: 3 NeXTcubes, 4 NeXTstations
Key Software: Interface Builder, Mathematica, Sybase and Objective C
Goal: Unify data from existing terminals, workstations, and mainframes on NeXT computers.

Sugar may seem simple to most folks, but ask Eric Spahr, vice president of Lehman Brothers' sugar department, and you'll see that even the sweet stuff can go sour. "Sugar is an extremely volatile commodity, doubling or halving its value every year," says Spahr. "To keep up with those wild changes, you need a lot of computing power."

When Spahr began looking to fulfill the needs of his ten-person, six-trader department, he knew what he didn't want. He had seen how Lehman Brothers' existing Sun networks required constant in-house technical support. Not only did Spahr lack the staff to run a complex network, but he had limited access to consultants. And he himself was no techie.

But after 24 hours on a NeXT workstation, Spahr wrote a small custom trading program that worked. "My initial reaction was, 'I'm not a programmer, but gee, I can do this,' " says Spahr.

Spahr and the six traders in his department trade tens of millions of tons of sugar annually. And with raw sugar trading at $170 a ton (at this writing), that's billions of dollars worth of sugar a year. Just 12 months ago, raw sugar traded at $360 a ton. And 12 months before that it was back down at $170. Spahr has been surprised at how fast he's been able to build custom applications to accommodate the rapid swings of the market. "These custom applications enable me to be on top of those changes," he says.

Quite simply, NeXT is helping him to get the job done–fast. "What it is allowing me to do is to buy some shrink-wrapped software and combine it with other stuff I write and satisfy what people need to do, without techs."

Spahr did require some outside help to install Sybase and coordinate his NeXT network with Lehman Brothers' wide variety of mainframe networks, but by and large he's been surprised at how well the applications have worked together. Spahr appreciates being able to take files he's set up and put them into Improv. Or to take an Improv number and put it into Mathematica.

Spahr uses Mathematica in an option-evaluation program he wrote. "It really shows off the machine, and it shows off Mathematica," he says, adding that it's easier to sell a customer on a recommendation

By JONATHAN LITTMAN

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if they can see what an investment will do graphically in Mathematica.

At press time, Spahr hoped to have most of his sugar-specific custom programs running in the next few weeks on the three cubes and four slabs installed in the sugar department. His long-range goal is to unify the data that runs on the mishmash of computers, terminals, and devices that clutter a typical sugar trader's office.

"We're dealing with six or seven different machines: a mainframe to do analytics, another to do technical analysis, a series of data-feed machines, and stripped-down PCs, telexes, and faxes. Hopefully, one day they'll all run through the NeXT and communicate."

Union Bank of Switzerland

Union Bank of Switzerland Securities
Location: New York
Application: Equities derivatives trading
Hardware: 14 NeXTstations
Key Software: Interface Builder, Objective C
Goal: Achieve competitive advantage by developing custom trading applications.

"It's a major political battle to buy NeXT," says Hadar Pedhazur, vice president, Equities Technology at Union Bank of Switzerland Securities (UBS Securities) in New York. "People are asking, 'What if NeXT goes out of business?'"

Pedhazur thinks that those who employ the doomsday argument misunderstand what NeXT offers. "We don't believe NeXT is going out of business, but it's a risk we're willing to underwrite for the benefit of using NeXT computers," says Pedhazur, who under the direction of A. Ramy Goldstein, manager of Equity Derivatives Products, is leading UBS Securities' efforts to install 14 NeXT machines for its equity derivatives traders. "We're in a business where responding in days or weeks instead of months is the difference between profit and loss," says Pedhazur.

Besides, Pedhazur says, the machines will earn their keep quickly. "If NeXT allows the bank to play in a new financial arena, we might make all the money to justify the risk within a one- or two-month period."

This is no dull corporate installation with elusive productivity goals. "I am not in the business of building three-year MIS systems," says Pedhazur. "I'm using the machine to bang out code the same day I buy it. I'd rather be banging out applications today than sitting here and worrying about the best hardware choice three years down the road."

> *"Decisions have to be made in seconds. If [competitors] decide before you, you lose."*

If Pedhazur sounds like he's familiar with the argument about NeXT's viability, it's because he's faced it before. Previously, both Pedhazur and Goldstein worked at First Boston Corporation, where they brought in over 50 NeXT workstations to the equity derivatives department. UBS Securities hired the team away when it decided to enter the derivatives business.

Equity derivatives are a new type of financial instrument whose value is based on multiple stocks and can thus be overlaid on a portfolio of stocks to guard against market declines. Superior equity derivatives programs track inefficiencies in key marketplaces–a task requiring computers to perform quick calculations and to display fields of numbers and graphs that highlight sudden changes. The margin for error on trades that typically reach hundreds of millions of dollars is nil. With many trades, decisions have to be made in seconds. And since competitors are watching similar screens, "if they decide before you," says Pedhazur, "you lose."

For UBS, it wasn't a question of choosing NeXT over another machine. "Before we came in, we told them, 'Here are some of the things we can do,'" says Pedhazur. "'If you want them done, NeXT is the box we suggest.'"

NeXT's proven speedy development cycle was the main reason they felt the job couldn't be done on another workstation. "You get a machine whose heart and soul is object oriented," says Pedhazur. "The tools that come out of other companies don't stand up."

Companies that choose another hardware environment, says Pedhazur, are having to start from the ground up. "Every single one is building their own tools in-house," he says. "*That's* a risk that isn't worth it to me."

Because custom applications are driving the use of NeXT at UBS Securities, programmers are central to the bank's strategy. A team of five programmers that reports to Pedhazur is developing the trading systems. All have experience building equity-trading systems, and four of the five have had one or more years programming on NeXT.

Though the applications are custom, Pedhazur says the risk isn't as great as it might seem. Models are created to analyze whether a type of trade will be profitable long before they go to the trouble of writing the entire application. He prototypes program-arbitrage systems in Mathematica and risk-analysis and options-arbitrage systems in Wingz.

At the time of this writing, the NeXT workstations had been at UBS Securities for only three weeks. Nevertheless, the schedule called for prototypes in two months, and production software in three to four months. Installed on the company's Ethernet TCP/IP network, the workstations will ultimately connect with UBS Securities' range of UNIX workstations and IBM mainframes.

If everything goes as scheduled, the software will be a competitive advantage for UBS Securities and a shining example for NeXT. "Any significant improvement in application development can have tremendous bottom-line results," says Cummings. "The trouble is that it's hard to quantify and hard to prove."

At the same time that NeXT is getting a chance to prove its mettle in custom software, standard applications have already begun to make inroads. Mathematica is a favorite of company theoreticians, while document creators appreciate FrameMaker's fluid integration of text, mathematical equations, and graphics. Diagram! is being used to create org charts and presentations and to diagram object hierarchies.

At present, UBS Securities has 14 fully loaded NeXTstations. Pedhazur anticipates buying one or two Cubes as department servers, and he may buy a few 8MB Stations for traders who need only a few applications.

While Pedhazur and Goldstein are satisfied with the early progress of the project, they realize that, like most deals on Wall Street, the bottom line will rule. "If we are successful, we will be forced to bring on more machines," says Pedhazur. "If we are unsuccessful, there won't be any more."

O'Connor & Associates

Location: Chicago
Application: Office Automation
Hardware: 200 NeXTstations and NeXTcubes
Key software: NeXTmail, Improv
Goal: Improve communications and productivity with NeXT systems as standard workstation

While other securities firms are employing NeXT for primarily custom applications, one of the largest NeXT financial installations is concerned less with programming than with old-fashioned productivity.

"Custom development is important, but in the initial part of our project it's almost secondary," says Robert Wilen, O'Connor & Associates' vice president, Technology Division, and NeXT project manager. "We want to get PC and Mac users onto the same type of technology: to give them a better networked, common PC."

The Chicago options and trading firm has always been an aggressive user of technology. Before making the decision in December 1990 to make a major NeXT purchase, O'Connor & Associates already had more than 400 Sun workstations installed for proprietary development and an equal number of PCs and Macs used for general productivity.

In NeXT, O'Connor saw a blend of workstation and PC technology. "NeXT was the first machine to provide 80 percent of what PCs and Macs provide *and* 80 percent of what the Suns provide," says Wilen.

The financial firm was impressed by NeXT's existing productivity applications. The UNIX orientation meant the machines would fit in with the company's TCP/IP Ethernet network and provide the immediate benefits of sharing files and electronic mail. And despite NeXT's upstart status, the machine represented a chance for O'Connor to unify its computer architecture.

Individuals in the firm had been buying large quantities of PCs and Macs. By offering them something they were unlikely to buy on their own, O'Connor hoped to bring rationality and planning to the company's technology direction. The company also hoped to give employees an attractive reason to gravitate toward the UNIX standard.

"Our idea is that the technology has to be compelling," says Wilen. "We don't want to cram NeXT down peoples' throats. It's a slick black machine people want on their desks."

> *NeXT could replace the mishmash of computers that clutter a typical trading desk.*

The focus on office automation, as opposed to custom financial programs, drove the 200-workstation purchase. "You need a critical mass," says Wilen. "You need to get the whole management group up and running. Until you do that, a manager won't use it."

Similarly, the thinking behind signing a major deal with NeXT was equally long-term. "A purchase of that size gave us a chance to be a significant customer of NeXT, to get some specific attention," says Wilen. "That strategy was right on the money."

Being a big customer has meant help from NeXT in designing and integrating O'Connor's NeXT network with its existing Sun network. Wilen also believes O'Connor has benefited from its product-development briefing by NeXT and close relationships with major software companies, such as Lotus and Frame Technology.

Those benefits would have been impossible from other vendors. "IBM and Compaq would laugh at a 200-machine order," says Wilen.

Another reason that O'Connor didn't buy PCs or Macintoshes is that the company felt NeXT's basic capabilities were superior. "Why not IBM or Mac?" asks Wilen. "Because the multimedia integration they're still talking about on the Mac and IBM is here today on the NeXT."

Early on, Wilen was almost embarrassed about O'Connor's "mundane" strategy for office automation. "In trading firms, traders get all the attention," he says. "We have bigger plans. We're including managers, secretaries, accountants, and lawyers. "Decision making and communication is what it's all about," he says. "We're giving them a tool that helps them do that."

The biggest success so far has been NeXT's electronic mail. "People who work on different floors can now work on an Improv spreadsheet and mail it up and down," he says. "The ability to say, 'Hey, I filled up Section 3 it's your turn on 4,' is saving people hours." Wilen says that electronic mail will prove critical for the company's international offices in London, Zurich, Geneva, Frankfurt, Tokyo, and Singapore.

Other important applications at O'Connor besides Improv include Wingz, FrameMaker, Diagram!, and TopDraw. And despite Wilen's low-key talk, O'Connor is doing its share of custom work. Five programmers started with "a clean sheet of paper" and wrote a fixed-income trading program with NeXTstep in a scant two and half months. The program was installed in the London office in May 1991 and scheduled to begin trading at the end of that month.

In Chicago, O'Connor has a pilot project with Global Vision of Palo Alto's ADapti, a market data viewing product currently on the Mac and the SPARCstation that is being ported to the NeXT. The company is also evaluating ticker plant software that feeds and consolidates data from Reuters, Knight-Ridder, and Telekur, offered by MarketView Software of Chicago. Installation of the workstations began in December, and 80 were up and running by April. All 200 are scheduled to be installed by Labor Day.

If Lehman Brothers and UBS Securities are proof that NeXT has the flexibility and muscle to tackle financial markets, then O'Connor suggests that the promise of those successes may earn NeXT a chance to play in more than just the trader's pit.

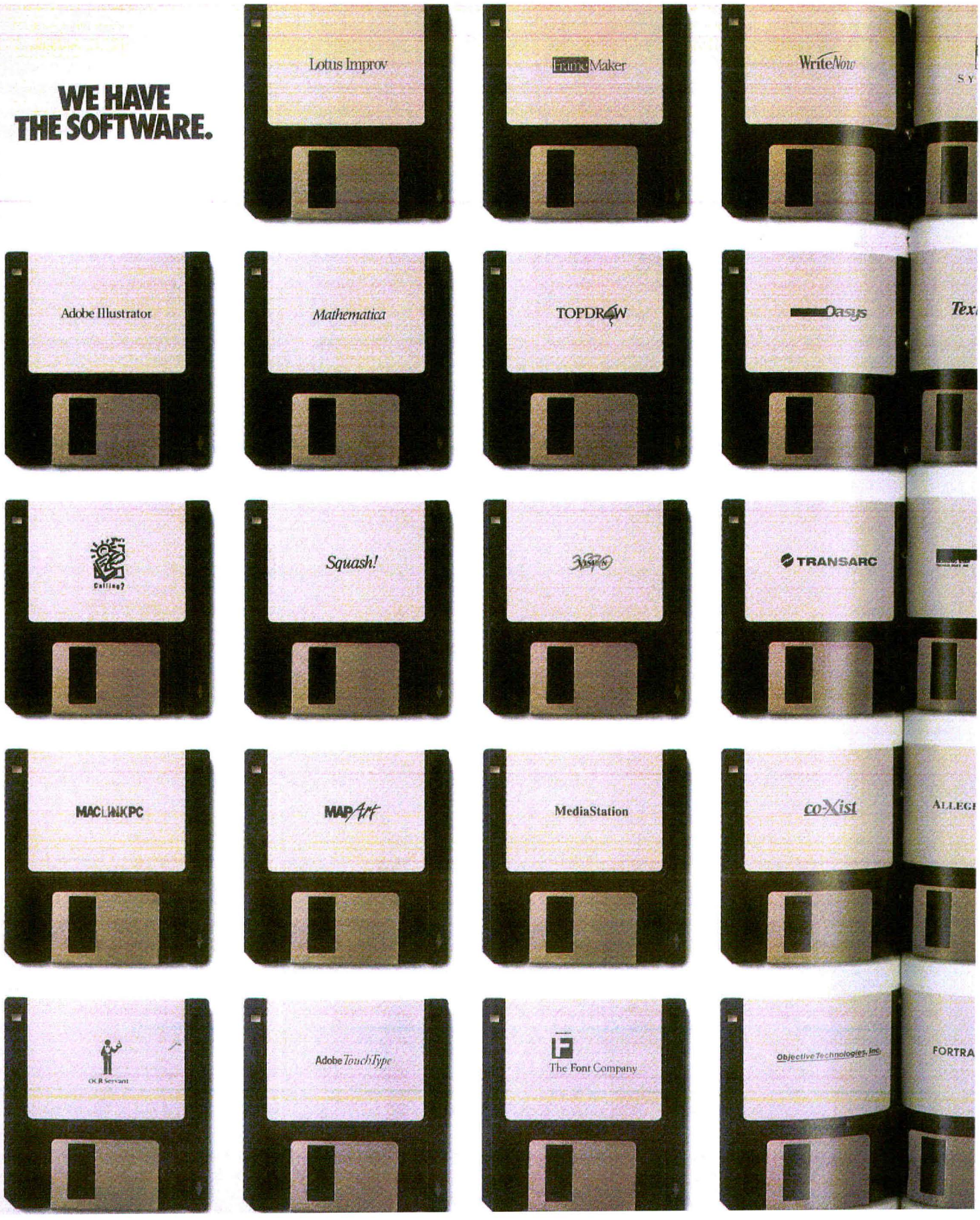
"Our game plan was to prove to traders that we had a product that was competitive," says Cummings. "Once you establish that, you can go into traditional PC applications. All Wall Street firms have legal departments, managers, and mergers and acquisitions departments. All of them need electronic mail, and all of them do a tremendous amount of work with spreadsheets."

Just ask Robert Wilen. Nobody's embarrassed anymore.

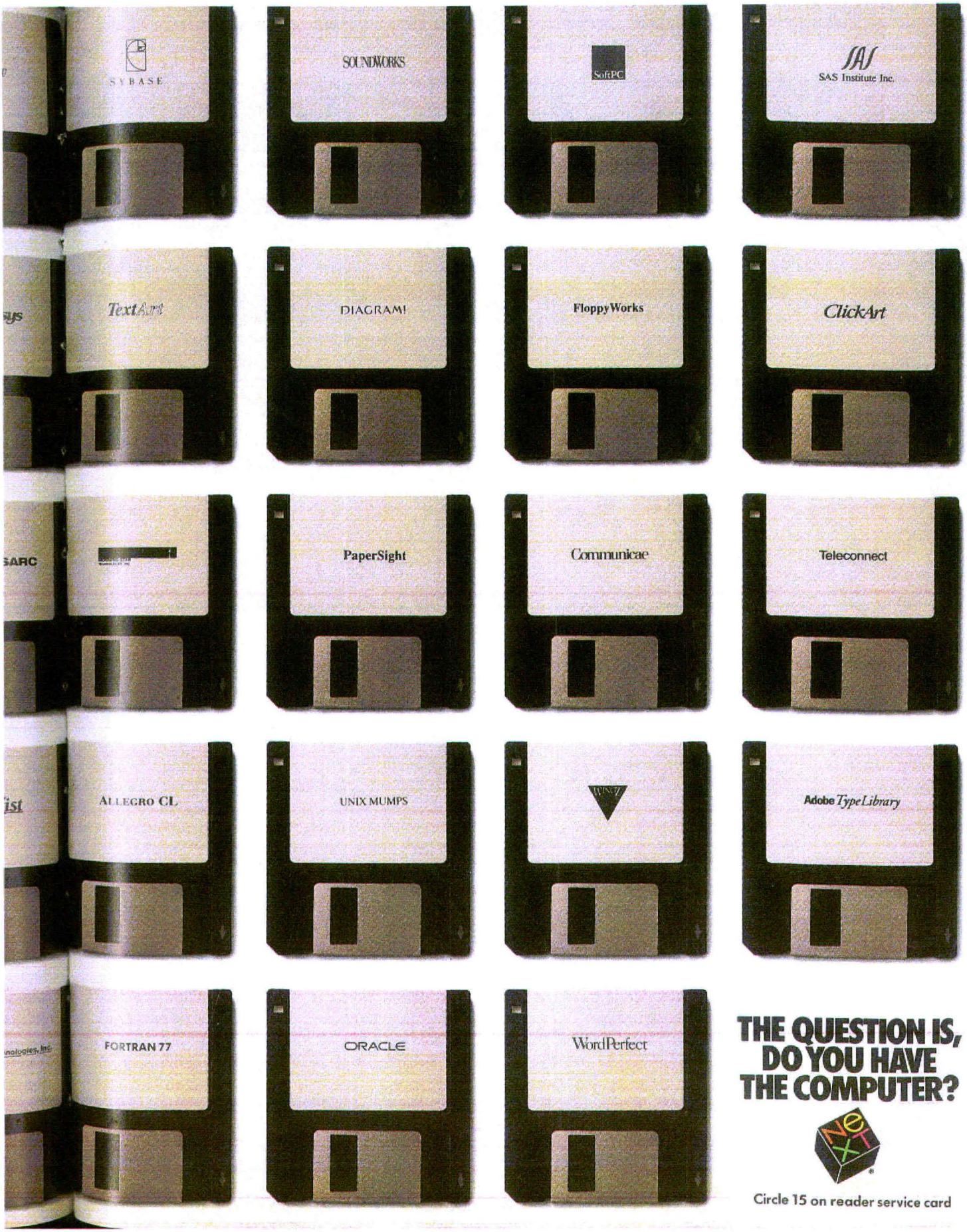
JONATHAN LITTMAN *is a San Rafael, California, writer whose articles have appeared in* Forbes, California Magazine, *and the* Village Voice.

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WE HAVE THE SOFTWARE.



SIMSON00000694



THE QUESTION IS, DO YOU HAVE THE COMPUTER?

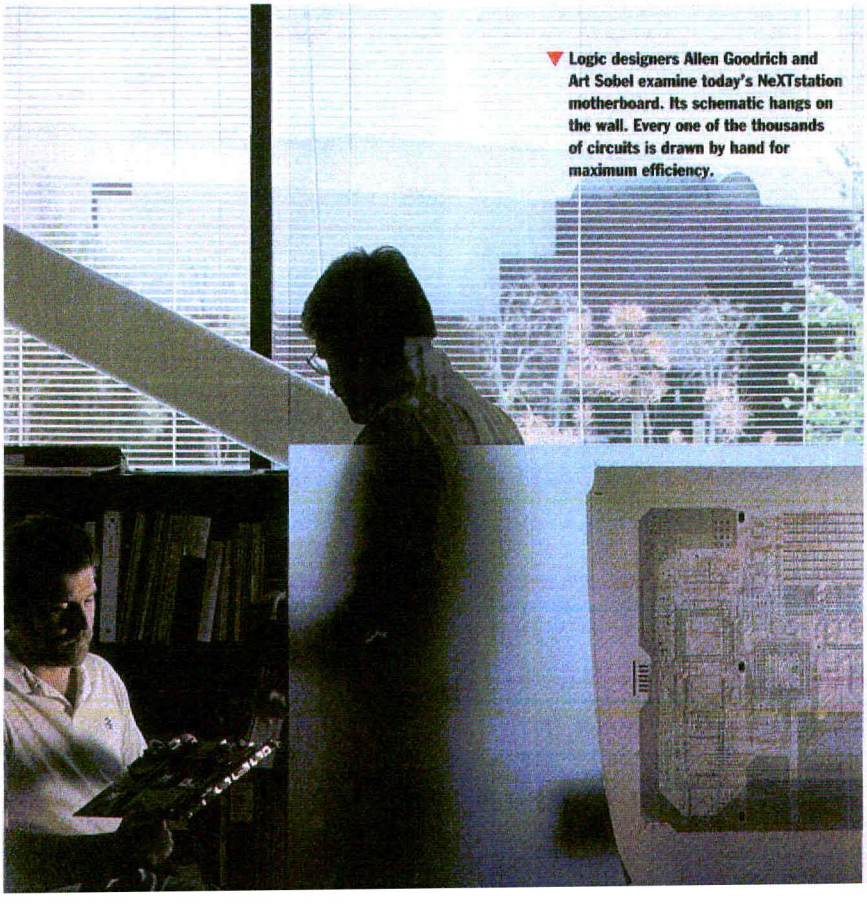
NeXT®

Circle 15 on reader service card

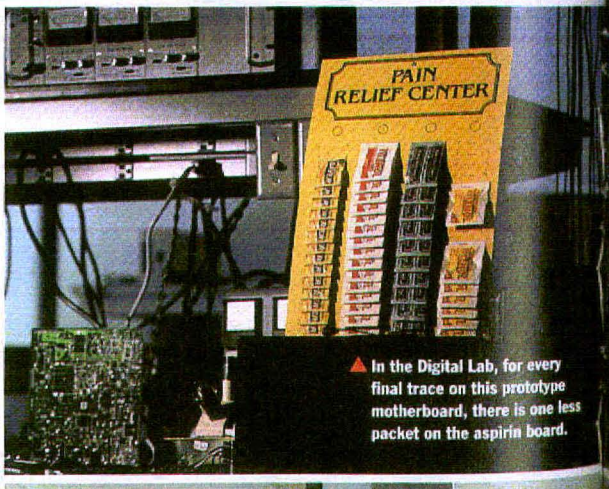
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▼ NeXT doesn't talk publicly about competative machines, but they certainly have one of each in the software configuration lab, where engineers test future NeXT systems for software compatibility across mixed networks.



▼ Logic designers Allen Goodrich and Art Sobel examine today's NeXTstation motherboard. Its schematic hangs on the wall. Every one of the thousands of circuits is drawn by hand for maximum efficiency.



▲ In the Digital Lab, for every final trace on this prototype motherboard, there is one less packet on the aspirin board.



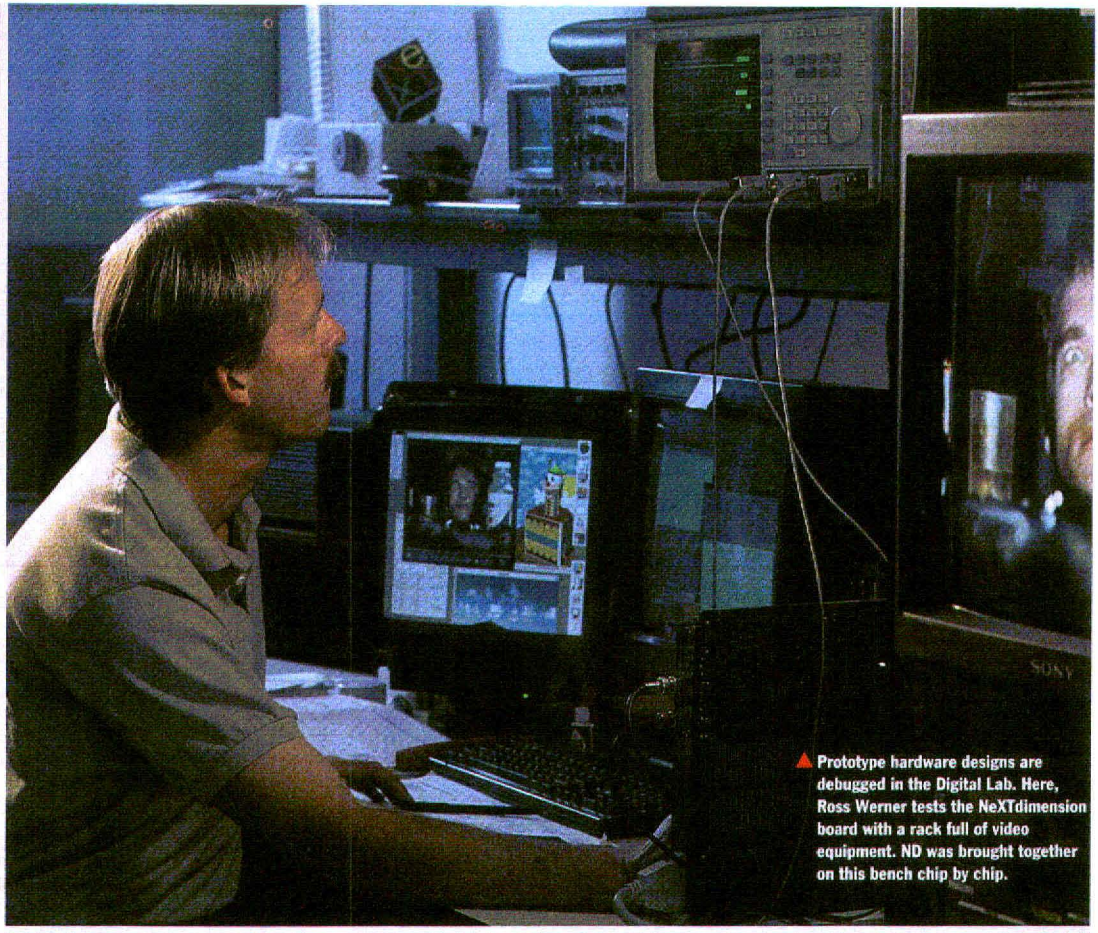
▲ To the guys in the Analog Lab, digital is just so much sand and

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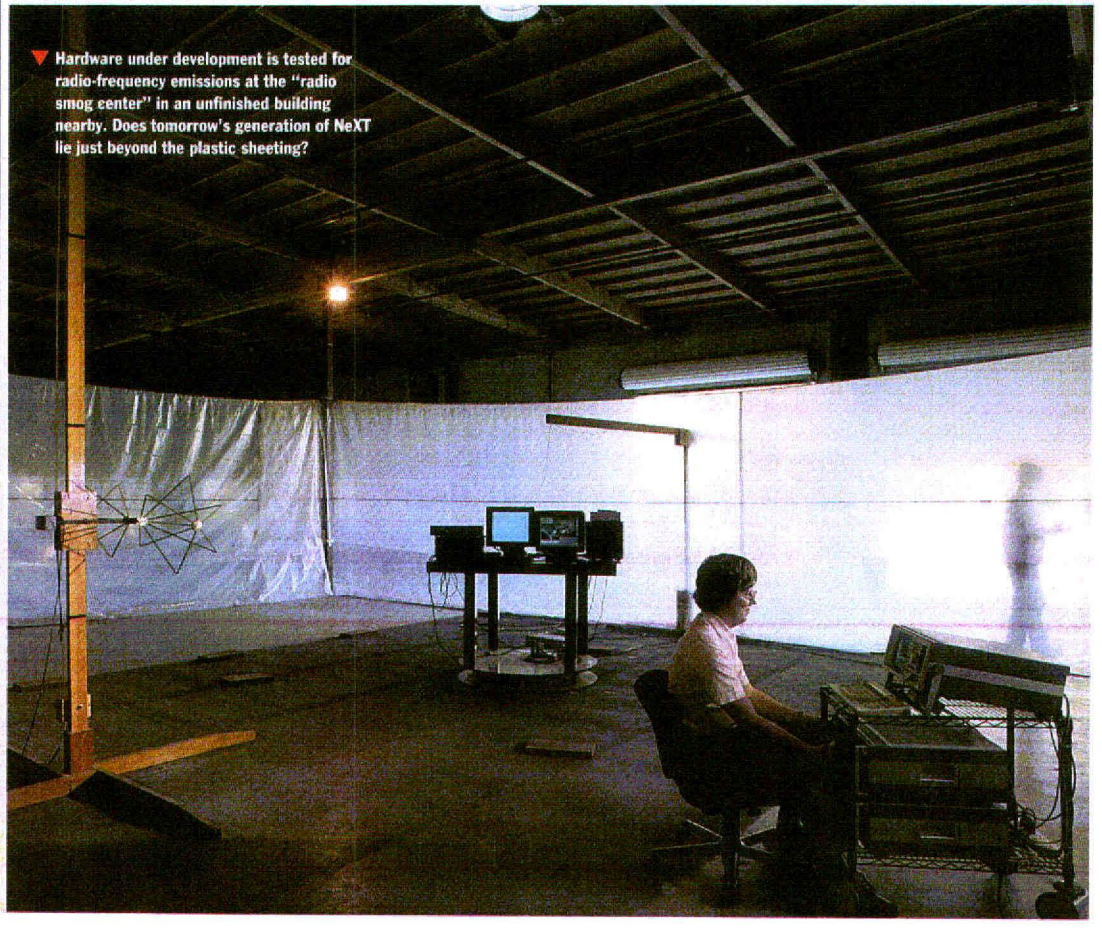
PHOTO TOUR

A Peek Inside The NeXT Product Labs

Beyond the high-style public face of NeXT headquarters is Building 2—a domain few outsiders ever see, filled with engineers few ever talk to. Like Willy Wonka's chocolate factory, it seems no one ever goes in and no one ever comes out. The blackout on visitors permits a wide-open environment inside: Engineers can freely exchange ideas without fear of disclosing company secrets. Here, under the direction of hardware guru Rich Page and software wizard Bud Tribble, NeXT's unsung heroes toil through late nights to invent the future of interpersonal computing. For the first time, Page and Tribble agreed to lift the veil for this photo tour of the NeXT product labs.



▲ Prototype hardware designs are debugged in the Digital Lab. Here, Ross Werner tests the NeXTdimension board with a rack full of video equipment. ND was brought together on this bench chip by chip.



▼ Hardware under development is tested for radio-frequency emissions at the "radio smog center" in an unfinished building nearby. Does tomorrow's generation of NeXT lie just beyond the plastic sheeting?



...ware engineering management team ...ight, Ken Haven, Rich Page, George ... Kevin Grundy, Jon Rubinstein) takes a ... the stairway that separates their ... the software domain above.

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The Great Write Hope

WordPerfect's new NeXT version straddles the middle ground between WriteNow and FrameMaker

by ROBERT LAURISTON

WordPerfect's arrival on the NeXT is newsworthy in several ways. It's the first fully WYSIWYG version of the most popular word processing program and the first leading application to be rewritten for Mach/NeXTstep. It's also the first full-featured word processor for the NeXT.

WriteNow is fine for knocking out short memos and letters, or even merging data for a mass mailing. But its graphics and text-formatting skills aren't really adequate when you want to put together a slick newsletter or presentation, and it doesn't handle long documents well. Until now, the only other choice available for such jobs was FrameMaker–a complicated, hard-to-learn program aimed at organizations putting out long, structured documents like manuals and catalogs.

With the appearance of WordPerfect, the NeXT word processing picture is starting to look up. The program combines the powerful features of WordPerfect 5.0 for UNIX (basically the same program as the WordPerfect 5.0 familiar to millions of DOS users) with the NeXT's graphical ease and PostScript imaging. While not the earthshaking innovation that NeXT might like you to believe–it's not as powerful as WordPerfect 5.1 for DOS, and several Mac and Windows programs are better graphical word processors–it's an impressive product, and a welcome addition to the NeXT's software selection.

Port of call

One of the program's biggest advantages is the name on the box: WordPerfect is synonymous with word processing for millions of PC users, and it is the word-processing standard in most offices. The NeXT version isn't quite as powerful as its DOS cousin, since it's based on 5.0 code rather than 5.1. That means there's no context-sesitive help, table editor, IF/THEN/ELSE mail-merge, or formula layout. It does have 5.1's Justify command, which lets you center or right-align selected paragraphs, not just single lines. Somewhere along the porting path some 5.0 features got lost, too: there's no interactive tutorial, macro programming language, or directory-wide text search. Otherwise, the program's capabilities are essentially identical to those of WordPerfect 5.0 for DOS.

It's a tribute to the skill of WordPerfect's programmers that they were able to turn a decidedly text-oriented program like WordPerfect into a WYSIWYG word processor. Unfortunately, holdovers from its character-mode past make WordPerfect for the NeXT quirky, confusing, and sometimes hard to use.

The biggest problem is the use of hidden codes for formatting. When you format a selection, WordPerfect inserts a code at the beginning of the block, and often at the end, too. The only way you can see what codes are in your document is by splitting the window horizontally between the regular display and the Format Inspector, a confusing and decidedly non-WYSIWYG view of the document that's required for some basic tasks. Another effect of this code-oriented approach is that many commands don't work the way they do in other NeXT programs. For instance, deleting a heading can change the font in the following paragraph.

As a result, anyone not familiar with WordPerfect 5.0 on the PC will sometimes find simple tasks daunting. Let's say you define a center tab on the ruler while preparing a chart. If you look in the Format Inspector, you find that text entered in the column is bracketed by center and end-align codes. If you later change the tab stop to a regular left tab, the previously typed text stays centered. To straighten it out, you have to delete the center code and type a new tab in every row of the chart.

Code-related problems affect many other features, including columns, kerning, and named styles. This stuff is bad enough under DOS; in a graphical environment, it's absurd, especially considering the specific example above was solved in 1989 by WordPerfect 5.1.

To fix this problem, WordPerfect should hide the gory details of formatting from the user. Since formats are associated with recognizable elements on the screen–characters, paragraphs, hard page breaks–the codes are redundant. WordPerfect for the NeXT does take a few steps in the right direction. Unlike its DOS counterpart, if you try to put format codes that belong at the beginning of a paragraph or the top of a page in the wrong place, or try to nest codes in the wrong order, the program usually puts them in their proper spot. All that's left is to make all the codes–and the insertion point–smart enough to go where they belong, then eliminate the Format Inspector.

Big fish, small pond

Okay, so WordPerfect breaks little new ground in word processing, or even in GUI word processing. But we still have every expectation that WordPerfect will add some hefty new tools to the NeXT's software workbench, right? Well, it does indeed. Once you get used to working with the hidden codes, WordPerfect has many advantages over WriteNow, particularly when you move beyond simple text formatting toward desktop publishing, or when a group of people are working together on a single document.

Want to put together a news-

WordPerfect 5.0

●●●

WordPerfect brings high-end word processing to the NeXT, with named styles, multicolumn formatting, and sophisticated graphics treatments. Ported from the company's WordPerfect 5.0 (not 5.1) for UNIX, its character-based roots show in its embedded formatting codes. Lack of Undo is a serious flaw. WordPerfect Corporation's track record of speedy fixes promises future improvements of an already strong product.

$495

WordPerfect Corporation, 1555 N. Technology Way, Orem, UT 84057. 801/225-5000, 801/228-9910 (NeXT support)

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letter, flashy report, or impressive presentation? WordPerfect's flexible column layout (you can start and stop columns within a document and adjust their widths individually), ability to wrap columns around graphics, free-floating text boxes for sidebars, and line drawing are up to the job. You can import graphics via the pasteboard, or simply drag their icons across the desktop and drop them onto your document. WordPerfect also supports NeXT's services, so functions from other programs such as Create!, Grab, and Librarian are available from within WordPerfect. Small caps, shadow, and outline text attributes (in tasteful moderation, please) help dress up headlines.

Although the hidden codes can be confusing, page layout is much easier than with FrameMaker or with character-mode versions of WordPerfect. When you run into problems, WordPerfect's knowledgeable telephone support staffers will walk you through difficult tasks (phone support is free).

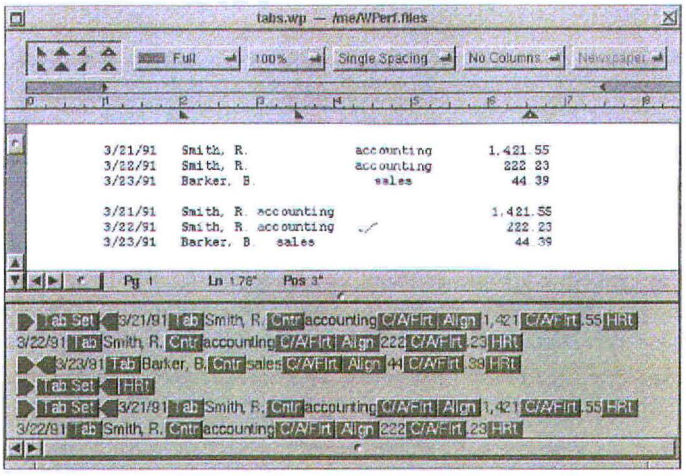
When working on books or other long documents, you can break them up into separate subdocument files to be edited by various people on your network, then use WordPerfect's Master Document feature to consolidate them automatically for printing. Other long-document features let you mark text for automatic generation of your table of contents, list of figures, bibliography, and index. You can also define automatic cross-references to keep your manuscript up to date as footnote, table, or illustration numbers change. You can mix portrait and landscape pages in a single file—very handy when you want to include a wide chart in the middle of a document.

Named styles let you reformat globally. For instance, you can change the font of all the headings in a document with a single command. You can also define a library of named styles, which can be shared by everyone on your network. Since styles can contain both formats and text, you can use them as form templates, say for generating letterhead on your laser printer or printing your return address on envelopes.

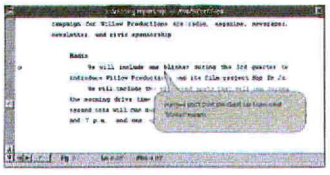
For tracking revisions, WordPerfect can compare the document on-screen with one on disk, redlining all new text and striking out deletions. However, the utility's usefulness is limited by its phrase-by-phrase comparison–change one word in a sentence, and Compare strikes out the whole thing, then inserts a redlined version with the changed word. You can also mark redlined or struck-out text manually. Once the revised document is approved, a single command will strip out all struck-out text and remove all the redlining codes.

WordPerfect does not yet support Lip Service, but you can add typed comments to WordPerfect documents without actually changing the text by adding pop-up comments. They appear in the margin as cartoon balloons; clicking on one pops up a larger balloon containing the comment. A pointer to the specific spot in text where you entered the comment makes it clear to what it refers.

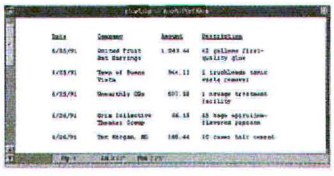
While this program doesn't have the DOS version's programmable macro language, its macro capabilities are otherwise excellent. You can record any sequence of keystrokes or commands, then clean it up in the built-in macro editor. Alternatively, you can just open the editor and start writing a new macro from scratch. You can load your favorite macros onto the program's menu, then tear them off and leave them on the desktop for single-click access. You can also assign macros to unused Alternate keys (unfortunately only 21 are free).



WordPerfect's code-oriented approach to formatting can make it hard to work with tabular charts. The second set of three rows shows what happened when we changed the stop for the third column from a center tab at 4.75 inches to a left tab at 3.5 inches. The items in the third column centered around the 3.5-inch stop.



Clicking on the cartoon balloon in the left margin pops up this nonprinting comment.



WordPerfect's Column feature lets you create multiple wrapping-text columns in a chart.

WordPerfect will import documents in several formats: text, RTF (Rich Text Format), RTFD (Rich Text Format with embedded graphics), or WriteNow files. It shares a common file format with WordPerfect 5.0 on other platforms, so you can exchange files painlessly with co-workers running DOS or UNIX versions of the program. You can even edit WordPerfect 5.1 files without harming them, though unsupported features like tables or formulas will display oddly, if at all. Sharing files with NeXT users who don't use WordPerfect is a problem, though: you can only save in WordPerfect format or as plain ASCII text.

Other miscellaneous goodies include the ability to append to the pasteboard, timed backup, password encryption of selected documents, a spell checker, and an on-line thesaurus. Unlike other versions of WordPerfect, you can select multiple tabs in the ruler and move them en masse, and there's no confusing dormant hard return—when a blank line would fall at the top of a page, it's just moved to the bottom of the previous page.

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Short of perfection

WordPerfect's documentation and on-line help could use some improvement. All you get is one page of installation instructions, a short training book, and about a megabyte of WordPerfect documents that briefly cover most of the features. While distributing documentation on disk is a reasonable approach, some of it is sketchy. (You'd probably have to get a DOS WordPerfect 5.0 manual or one of the many third-party books before you could use the arcane mail merge codes.)

WordPerfect's Help utility is imperfect. It opens the help text as a WordPerfect document instead of having a dedicated help window. You can browse help topics alphabetically or hierarchically, but you can't search, so it's often hard to find what you want. A better solution is to install the docs in the Digital Librarian and skip the built-in help. One thing that needs to be added is a listing of the codes in the Format Inspector, since some of them have cryptic labels that don't clearly indicate what they are.

WordPerfect's misnamed Outline command is not like the collapsible, hierarchical outliners you might have used in other programs. It's little more than automatic paragraph numbering.

We encountered a few bugs in 1.0.1. Setting fonts is occasionally flaky: once in a while what you see on the screen doesn't match what you see in the font panel, and changes to multiple font selections don't always do what you'd expect. When typing at the end of a line, words sometimes run together, or the first letter of a word ends up at the end of the previous word. If you double-click a WordPerfect document in the workspace after you start the program, it opens, but the menus don't appear. Considering how fast the company cleaned out the many bugs we found in release 1.0, these minor problems may well be fixed by the time you read this. Be sure to call WordPerfect tech support and ask for the latest version.

Several other bugs are long-standing WordPerfect problems carried over from DOS, so there's no telling when they'll be fixed. Blank spaces before a hard return can wrap to the next line, putting an extra blank line between the paragraphs. The word count utility ignores numbers. In the that's-not-a-bug-that's-a-feature department, when you suppress page numbering on the first page of a document, the bottom margin drops down to where the number would have been. (The workaround is to use two overlapping footers, one of them a dummy. But didn't you buy a NeXT to get away from that kind of nonsense?)

Contender or champ?

While all those useful features give WordPerfect quite an edge, WriteNow still has a few advantages. WriteNow's Undo is far superior to WordPerfect's Undelete, which simply pastes whatever you last deleted at the current insertion point (not back from where it was cut). In WriteNow, copying formats is as simple as pasting a ruler; in WordPerfect, you have to block and copy a group of hidden codes. This is made more difficult by the fact that you can't click and drag to select a block in the Format Inspector, so you have to use the Alternate and cursor keys instead. WriteNow has smart quotes, while WordPerfect makes you type them in manually.

The two programs proved equally fast at opening and saving documents, scrolling, editing, and reformatting. The one major difference was the Replace All command used in a large document. WriteNow took nearly six times as long as WordPerfect and couldn't handle the task on documents over a certain size (around 80K in our tests)–though it can undo the operation, while WordPerfect can't. WordPerfect's formatting codes seem to take up more space than WriteNow's. Text-only files from the two programs take up about the same amount of disk space, but heavily formatted WordPerfect documents can take twice the space of equivalent WriteNow files.

To hear Steve Jobs tell it, WordPerfect for the NeXT is the greatest word processing program in the world. Is it? Well, not quite. While it does offer a host of nice (though not innovative) features, it's a few steps behind its DOS counterpart, and its code-oriented approach makes it harder to learn and use than other graphical word processors.

But there's no need to exaggerate WordPerfect's virtues, which are quite adequate to make it a very welcome addition to the NeXT user's toolbox. It's a far more capable word processor than WriteNow and a much easier page layout program than FrameMaker. Unless WriteNow does everything you need, WordPerfect for the NeXT is well worth its modest cost.

ROBERT LAURISTON *is a self-employed computer industry writer and consultant. He can be reached by e-mail at duck@well.sf.ca.us.*



Columns, free-floating graphics, lines, and text boxes let you lay out simple newsletters. Notice the dot-leader tabs in the table of contents.

Does One Frame Fit All?

The only page-layout program on the NeXT, FrameMaker is best suited for long documents

by HELMUT KOBLER

Frame Technology's FrameMaker has a lot riding on its shoulders. As the only page-layout program currently available for the NeXT computer, it has to pack plenty of features and functionality. FrameMaker's product literature portrays the product as the virtual Veg-o-matic of publishing: good for producing everything from memos, brochures, and newsletters to lengthy technical manuscripts and documentation.

FrameMaker can indeed be used for the entire gamut of publishing projects, but its complexity and design limitations make it unsuitable for highly designed, unstructured, four-color work. FrameMaker is, however, a formidable tool for working with structured documents–publications with similar formats from page to page, such as manuals, catalogs, and books–especially in multiplatform, networked offices. If it's not the ultimate page-layout program, don't blame Frame. It has declined to shoulder the entire burden for page layout on the NeXT, opting instead to fulfill a specific niche across many platforms.

Structured thinking

FrameMaker, as its name implies, uses what Frame Technology terms a "frame" approach to publication design: you draw, or let the program draw, rectangular frames on a page, then place graphics and text into them. Designing a layout in FrameMaker starts with its master pages, where you set up column formats and elements (such as rules and page numbers) that will appear on every page. You can create up to 25 master pages per document so that you can quickly switch between predefined, custom layouts. For example, you could have one layout for a title page and another for a standard three-column page with a sidebar. With a basic layout established, FrameMaker automatically flows text from column to column and page to page.

While master pages control each page's design format, FrameMaker's text "tags," also known as style sheets, are your main controls for formatting a document's text. Tags are collections of FrameMaker's text styles and formatting information such as font, size, style, alignment, hyphenation and justification, kerning, leading, indents, tabs, and so on. You'll create a distinct tag for every text element in your document: body text, chapter titles, headlines, subheads, and footnotes. You can quickly apply these predefined formats by selecting some text and then picking the appropriate tag from the tag list. You can update the text later (for example, changing all subheads from Helvetica to Times) by simply changing the tags.

FrameMaker's tags have two other notable features. First, you can create tags that affect whole paragraphs or character tags that apply only to parts of a paragraph. Second, tags can include graphics. For instance, you can specify that a chapter heading tag will always print a company logo beneath it.

Good references

FrameMaker manages all the elements that are potential headaches for long-document publishers: a table of contents, lists of figures, indexes, and cross-references. One significant feature is FrameMaker's automatic paragraph numbering. (Neither of the page-layout pacesetters, PageMaker and Quark XPress, have this feature, although the PC standard for long documents, Ventura Publisher, does.) This handles all the numbered chapters, headings, and subheads that might divide a document. For instance, you can set FrameMaker's numbering scheme to label a section as 2, followed by related paragraphs called 2-a, 2-b, and so on, which in turn lead to subpoints 2-a-1, 2-a-2, and so on. FrameMaker can also number graphics and tables (1.1, 1.2, 1.3). If you later add, delete, or rearrange these paragraphs or graphics, the program automatically renumbers everything to reflect the change.

Another of FrameMaker's appreciable talents is cross-referencing. A special panel lets you set up a reference to a passage, heading, or graphic with wording like, "See Item XYZ, section 1.2.4, page 24." From then on, FrameMaker keeps that reference accurate, updating it to reflect any later changes in the reference's name, section number, or page number. You can similarly mark chapter titles, section and subsection headings, and even titles for tables and graphics, to appear in a table of contents or list of figures page.

Likewise, FrameMaker will compile marked text into a thorough index. It can index entire passages, under more than one word. For instance, a discussion on DNA can be indexed under *DNA*, *genetics*, and *Genentech*. It can make hierarchical entries such as *dogs* and *cats* under the heading *animals*, and finally, make cross-references to guide readers to other related index topics. FrameMaker even lets you make multiple indexes in the same document–say, one for subjects, one for authors, and yet another for graphics and figures.

For large projects, you'll want to create chapters as individual FrameMaker documents, partly to keep file size down and the program running fast, and to enable a staff to easily divide up the work. In any case, you'll use FrameMaker's Book command to bring all of these separate files into one document. Through a panel, you choose which files to link, and in which order. FrameMaker handles the rest, automatically renumbering chapters, sections, graphics, and pages, and updating all the combined cross-references in these documents. You can just as easily rearrange the order of chapter files–in case you decide to change Chapter 2 to Chapter 4–and FrameMaker updates everything accordingly.

FrameMaker 2.1

●●●●

A sophisticated page-layout program with built-in word-processing and graphics features, targeted at departments that publish book-length documents. FrameMaker's huge feature list makes it capable of, though not ideal for, almost any kind of job. In the interest of maintaining cross-platform compatibility, it passes up the opportunity to take advantage of NeXT's unique abilities.

$995

Frame Technology Corporation, 1010 Rincon Circle, San Jose, CA 95131. 408/433-3311, 800/843-7263, 408/433-1928 fax.

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One for all

Unlike most page-layout programs, FrameMaker provides an all-in-one publishing package with both a built-in word processor and a graphics program. You and your staff can create most of your publication's elements with one convenient program. On the word processing side, FrameMaker's sharp spelling checker, find-and-replace feature (which recognizes text styles), automatic hyphenation, macros, and extensive footnote options will often be all you'll need to compose text.

The program also provides some high-end features. With FrameMaker's variables, you can place generic references throughout a document, such as "date," or "chapter title," and then later define the values for these variables. FrameMaker will update them globally or individually.

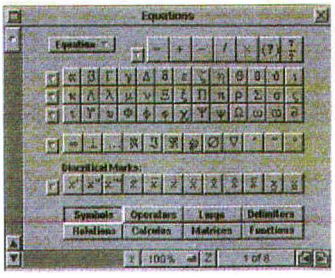
In version 3.0, due this fall, FrameMaker will add an impressive conditional text feature. By tagging text with conditional tags, you will be able to instruct FrameMaker to display and print some paragraphs and to hide others. Among other things, this will allow you to design a basic layout for, say, a software manual, and then, through conditional tags, create different text for NeXT, Mac, and PC versions. To print each respective edition, you'll just tell FrameMaker which conditional tags to recognize.

FrameMaker also includes special features for building tables and formatting scientific equations, simplifying the production of technical documents that often call for such items. The program's table editor makes easy work of adding, deleting, rearranging, and resizing columns and rows–as if you're working with the flexible cells of a spreadsheet program. Version 3.0 will also merge columns, and let you spruce up tables with various border rules and fills. Putting together equations in FrameMaker is a matter of pointing to and clicking on an expression in the equation palette (and several sub-palettes) and then typing the values you want to plug in. This is a welcome departure from the cryptic typesetting codes that most word processors use for equation editing.

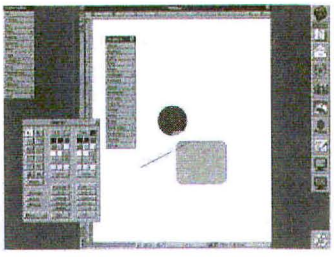
FrameMaker can wrap text around the rectangular frames holding graphics, but it can't do the same around the image's actual contours–one of the program's design limitations. On the plus side, FrameMaker lets you anchor graphics to any point in a text column–perhaps you want to link an illustration to a related section heading–so the two elements stick together, no matter how much the text may move during layout. Unfortunately, you can't similarly anchor a text frame, such as a pull quote or a caption.

If you do use another program to prepare text, or if outside writers submit copy in other formats, FrameMaker imports ASCII, WriteNow, and Rich Text Format (RTF) files. Using RTF, you can also bring in files created by PC and Mac applications such as Microsoft Word and WordPerfect, although some formatting, such as style sheets, won't transfer.

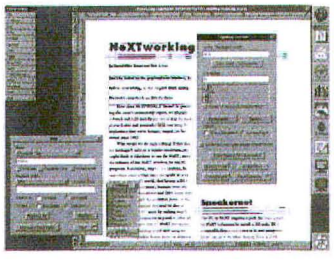
FrameMaker's built-in, object-oriented graphics tools are comparable to those of a meat-and-potatoes drawing program such as MacDraw II. FrameMaker lets you draw all the standard shapes (circles, ovals, rectangles, rounded boxes, arrows, freehand lines, Bezier curves, etc.), with 15 fill or pen patterns. A host of graphics editing features include object grouping and alignment, text and graphics rotation in 90-degree increments, and horizontal and vertical flipping. If you require high-end illustration functions such as special PostScript fills, single-degree rotation, layer control, object merging, special text effects, and so on, you can always turn to programs such as Adobe Illustrator or Media Logic's Top Draw. FrameMaker imports standard TIFF and Encapsulated PostScript (EPS) files from such applications on the NeXT, Mac, PC, and other platforms.



If your field is scientific and technical publishing, you'll like the simplicity of FrameMaker's equation palettes: Simply click on the desired expressions and functions in the palettes, and Frame inserts them.



FrameMaker's basic graphics functions include a variety of drawing tools, fill and pen patterns, arrow icons, and features such as flip, rotate, align, and grouping of objects.



FrameMaker packs a good deal of word-processing finesse: Its find-and-replace feature searches for style tags as well as characters, and the spelling checker keeps an eye out for repeated words and poor hyphenation as well as misspellings.

FrameMaker has a "hot links" feature to automatically update imported graphics when they're altered in their original program. This way, when a staff artist revises an illustration, a layout designer won't have to manually replace the graphic. Unfortunately, FrameMaker won't similarly make updates to imported text files, although this feature is on the company's wish list for a future program update.

Frame's soup-to-nuts approach to publishing reflects its origins in other platforms. The NeXT multitasking operating system and support of standard file formats, interfaces, and interapplication communication via services obviate the need for such all-in-one solutions. These features make it possible on the NeXT to run programs side by side and to pull in data, and even functions, from other programs whenever necessary. For groups focused on single tasks, though, such as a company's documentation department, learning just one program, and having only a single window to work in, could be handy.

For the workgroup

Frame recognizes that publishing long documents entails the cooperation of workgroups that might include a number of editors, copywriters, artists, and layout designers, all connected on a network. And that network might include different types of workstations. FrameMaker accommodates this kind of teamwork to a greater extent than do most page-layout programs.

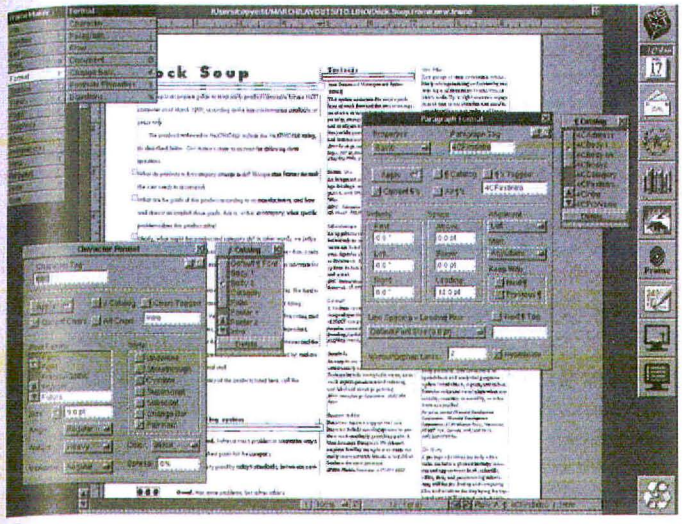
FrameMaker has its own system of file permissions for network work, which overrides UNIX's system-level permission handling. If one person on the network tries to open a file that another person in the workgroup already has open, FrameMaker displays a message warning the second reader that someone else is working on the file. You are forewarned that you may lose any changes you make; only those changes made by the last person to work on the file are saved.



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FrameMaker's Character Format and Paragraph Format dialog boxes are the keys to setting up the program's powerful text tags (style sheets), which define the formatting for all the text elements in a document. FrameMaker also uses these tags to quickly build indexes, a table of contents, and cross-references.

FrameMaker's Book command (described above) can assemble files from anywhere in a network: Chapter 1 can be on one machine and Chapter 2 on another. Frame spokespeople also point out that FrameMaker 3.0's conditional text feature should be useful for supplying comments by workgroup members on common documents. The editors' comments can be displayed or not, at the reader's choice, and each editor can use a different style (or color, on color NeXT systems) to differentiate between comments. (The NeXT's Lip Service voice annotation feature supplements that capability.)

Frame has versions of FrameMaker for the Macintosh, IBM RT, Sun, and other UNIX platforms, and Frame promises that the documents from each version are completely interchangeable. In other words, a FrameMaker book created on the Macintosh can be opened and edited on your NeXT, and vice versa. This is a real boon if your workgroup features a diverse range of hardware, because it lets you integrate the NeXT without sacrificing application standards and compatibility.

These workgroup features, though, won't solve all the complexities of workgroup publishing. Indeed, working over a network brings up a slew of issues that no page-layout application has yet addressed, such as setting file-access privileges for different members of a workgroup and tracking changes to a document. Separate programs, such as the upcoming Boss Document Management System from Boss Logic and PaperSight from VISUS, will. That FrameMaker includes any workgroup features is another example of its ambitious attempt to provide a complete set of tools for its target audience.

No designs on design

Although FrameMaker makes assembling and managing long documents easier, it's not the best solution for shorter publications. FrameMaker has the tools to produce simple brochures, newsletters, and advertisements, especially with its built-in word processing and graphics capabilities. But these kinds of publications don't require FrameMaker's powerful long-document features and don't justify the program's $995 price tag. Depending on the complexity of your publication's design, you might be just as well-off using WordPerfect instead. Besides, when you publish infrequently (a monthly newsletter, for instance), you'll want a fairly intuitive program that you don't have to relearn each time. Given FrameMaker's complexity, it takes some effort to learn, which makes it less than ideal for occasional use.

At first, you may feel overwhelmed by the multiple menus, submenus, dialog boxes, buttons, and other options. In tackling your first major FrameMaker project, expect to spend time flipping through the program's five manuals or regularly referencing its excellent on-line help system. If you don't specifically need FrameMaker's extensive features, they'll only get in the way.

Publications that focus on sophisticated, flexible design–some books, magazines, and glossy advertisements–will probably require features that FrameMaker doesn't have. FrameMaker does surprisingly precise typography for a program oriented to long-document production (point size and leading can be set in .001 increments, for instance), but it doesn't have type-scaling controls, which have become popular in packages such as PageMaker 4.0 and Quark XPress on the Mac. Also, FrameMaker's inability to wrap text around irregularly shaped graphics would frustrate many designers.

A more serious weakness is FrameMaker's limited color handling, which prevents you from printing text and graphics with more than eight spot colors. This is perfectly adequate for documents that don't go beyond black-and-white laser printing, but other publications such as full-color textbooks, catalogs, and manuals, which FrameMaker is otherwise qualified to handle, need standard four-color separations. Given the interest nowadays in color publishing, and the fact that the NeXT is such an able color platform, we hope that FrameMaker will improve in this area.

FrameMaker 3.0 will add the conditional text and better table-handling features to the current package but not much else. (The upgrade will be free to FrameMaker 2.1 customers subscribing to Frame's Support Subscription and to all customers who have purchased FrameMaker 2.1 licenses between March 4, 1991, and the product ship date; otherwise, the upgrade price is $150.)

With its complexity and premium price, FrameMaker would be overkill for someone who publishes only memos, fliers, and brochures. WordPerfect could handle these tasks easily. Likewise, many publishers whose work demands color flexibility may have to wait awhile for the promised NeXT version of Quark XPress. (According to NeXT, XPress for the NeXT is due out next year.) Still, FrameMaker's huge feature list makes it capable, though not ideal, for doing a little of almost every kind of job. And if your work calls for long documents with large page counts, multiple chapters, tables, lists, illustrations, and indexes, then you won't believe your luck. For tackling these mega-projects, FrameMaker is as good as they come.

HELMUT KOBLER *is the author of* Campus Computing *and a contributing editor of* Publish *magazine.*

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OCR at Your Service

Optical character recognition (OCR) can be a wonderful thing: It takes scanned-in bitmaps of letters and numbers and converts them into editable chunks of ASCII text. The problem is that there is an almost infinite variety of ways to form characters, so that recognizing them reliably turns out to be an incredibly hard thing for a literal-"minded" computer to do well.

My previous experience with OCR, using Caere's OmniPage on the Mac to convert faxes to text, was discouraging. That's why I was excited by a recent NeXT technology demonstration that prominently featured the ability of HSD Microcomputer's OCR Servant to accurately read faxes.

Now, after putting OCR Servant through its paces for several days, I find that while it works well with high-quality scanned images, its recognition rate is not good enough for the vast majority of faxes I receive. Unfortunately, it seems that NeXT has promised more of OCR Servant than it can deliver. HSD, on the other hand, has been more restrained in its claims. I found that the product lived up to this more modest billing.

OCR Servant works well with images that use the 12 fonts and sizes (between 8 and 36 points) for which the software is optimized. It is also fast, processing documents about four times faster than OmniPage 2.0 on a Mac SE/30. Images can be generated by a scanner or a fax machine. It is in the area of faxes where OCR Servant's shortcomings become apparent.

Fax image clarity varies greatly with the method of generation. A fax can be generated either optically, by a fax machine, or by a computer, using a fax modem. Both fax machines and modems are able to transmit either in standard mode (100 by 200 dots per inch) or fine mode (200 by 200 dots per inch). Unfortunately, since fine mode doubles the transmission time, most faxes are sent using standard mode.

I tested OCR Servant using different fax versions of the same press-release excerpt (see figure).

With a fax generated by the NeXT computer, OCR Servant made only one minor error in converting the image to text. With an optically generated fax in fine setting, there were only two errors.

But using an optically generated fax in standard mode, which HSD explicitly does not support, the text file came out like this (errors in bold):

> SAN FRANCISCO, April, 1991 – International Data Group, Inc. (IDG) today announced a new publication schedule for NeXTWORLD magazine, the information source for users and buyers of NeXT computer systems. Beginning in July, NeXTWORLD will publish product-focused quarterly issues supplemented by news-oriented monthly newsletters

This fax, generated by a modem in fine mode, served as our test document.

> SAN FRANCISCQ, April, 1991- International Daca Group, Inc. (I~G) today announced a new publicatia~ schedule for NeXnX-IORL13 magazine, the information source for users and buyers of NeXT computes systems. Bginning in July, NeXTWORLD will publish praduct-focused quarterly issues supplemented by news-oriented monthly newsletters . . .
>
> At this level of accuracy, it would be far quicker to employ one's own on-board optical recognition system and simply type the thing in.
>
> One thing I loved about OCR Servant is its excellent use of a Services menu item. Here is a product so in accord with the idea of software "objects" that it exists only as a service, not on its own. This is the shape of things to come (though HSD is working on a stand-alone version).
>
> Despite all my frustration with the current bleeding edge of this technology, I'm going to use OCR Servant as much as the people who fax to me will allow. What I really want is e-mail instead of faxes, but since I can't get my correspondents to switch over, I might at least be able to get them to set that quality switch to fine.

by JOHN PERRY BARLOW

OCR Servant

●●●

This services-based optical-character-recognition program is a good performer within the tight parameters of current technology. This version works only through the services menu; a stand-alone version will be released later.

$295; free unlimited technical support

HSD Microcomputer, 1350 Pear Ave., Ste. C, Mountain View, CA 94043. 415/964-1400

Floppy to go

If you own a NeXT computer and don't have a floppy drive, you will need one very soon. Commercial software is now often available only on floppy, and the new format is also becoming the medium of choice for exchanges between users.

The PLI SuperFloppy 2.8 from Peripheral Land Incorporated (PLI) is an external floppy drive that works with any NeXT system, whether you're retrofitting an old Cube, adding extra drives



to new systems that have filled their internal bays with other drive systems, or just wanting another floppy drive.

The PLI drive uses the same Sony 2.88MB mechanism that ships in the current NeXTs. It can read and write three kinds of disks: 720KB, 1.4MB, and 2.88MB ED (extended density), with either MS-DOS/OS-2 or NeXT (UNIX) file structures. Digital Instrumentation Technology's FloppyWorks software, designed to supplement its own, competing floppy drive, can be used with the PLI drive to read 1.44MB Macintosh-formatted disks.

The software that supports the floppy drive is built into NeXTstep, so the PLI package includes no software and little extra documentation. Setup time is minimal, though you will need a SCSI cable, which is not included. The SuperFloppy has two SCSI ports, an external switch for internal temination, and a rotating SCSI address selector for convenient daisy chaining, The power supply is external, adding extra bulk to the system.

When the SuperFloppy began shipping in February, some early units had technical problems. By all reports, PLI has worked through them and worked with early buyers to replace faulty units. In our tests, shipping units were working reliably.

PLI pays tribute to NeXT with its black casing and its support of the new 2.88MB floppy technology. Athough the advantages of 2.88MB technology are currently

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X on the NeXT

In 1983, MIT started Project Athena, a campus-wide endeavor to integrate computers into undergraduate education. One of Athena's major breakthroughs was X, a software environment that permits text and graphics to be displayed on any type of computer connected to the network.

MIT made the program freely available to universities and computer companies alike. Over the years it has evolved into a standard UNIX windowing environment with a wide range of applications that support its drawing protocol. The program is now in the fourth revision of its eleventh major version (X11R4).

For NeXT users who want to run X applications, MIT distributes an X11R3 server (the third revision) called XNeXT, which can be obtained by anonymous file transfer protocol (FTP) from the computer athena-dist.mit.edu. Now Pencom Software has brought a commercially supported X11R4 to the NeXT computer under the name co-Xist.

Co-Xist consists of a runtime system (including an X server, X clients, and window managers, as well as manual pages and demonstration programs) and a set of development tools (including the toolkits and libraries necessary to build X-based applications on the NeXT machine).

Pencom also sells Motif 1.1–the Open Software Foundation's graphical user interface, toolkits, and window manager–and versions of the MIT X11R4 and the Motif user/programmer documentation as separate products. Motif gives X applications a "look and feel" similar to Microsoft Windows.

To build co-Xist, Pencom created a customized X server running in a NeXT window. This window is basically an independent X terminal, complete with its own window manager. Since X has its own drawing protocol, Pencom made the X server render X drawings into PostScript. Unlike other implementations of X on the NeXT, which completely take over the MegaPixel Display by their ability to switch between environments, Pencom's approach allows both NeXTstep and X to display and work at the same time.

By and large, co-Xist works as expected and performs well. Its 2-bit grayscale window manager looks great in comparison to monochrome X servers. The speed of co-Xist is well optimized, mouse and keyboard interaction is very responsive, and animation programs work well when there is enough memory to prevent disk swapping.

Unlike typical X servers, which require the expertise of a system administrator for installation and configuration, anyone can install co-Xist in about 30 minutes with only a little luck. The documentation is good at explaining how to use the installer software, but the later steps in configuring X files in user home directories raises some confusion. Without proper X reference documentation (Pencom recommends the *User's Guide for X11R3 and R4* by O'Reilly & Associates), you may need an X guru to help you. The entire installation takes up 45MB of disk space. Pencom's technical support was very responsive and helpful.

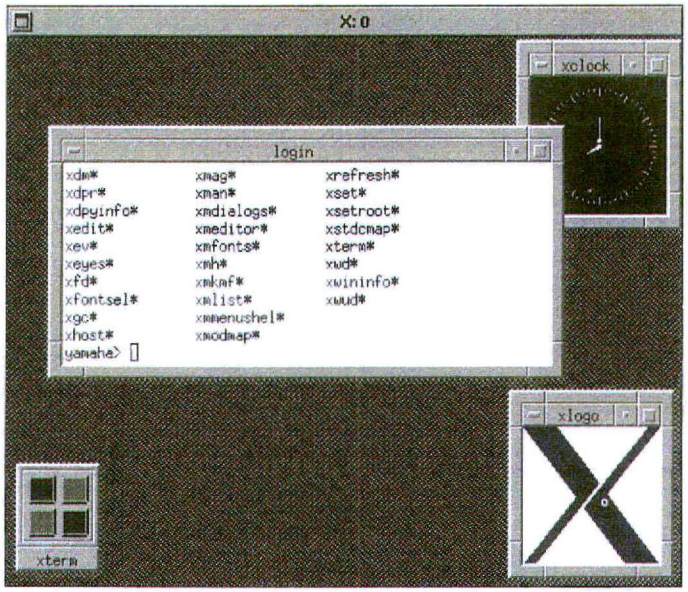
There are a few minor irritants. It takes 15 seconds for programs to appear when co-Xist starts to run. The 2-bit X server is unusual in the X community (most others are either 1-bit monochrome, 4-bit color, or 8-bit color), so some X programs will break. None of the source code was made available for sample X programs.

A problem with both XNeXT and co-Xist is that all X applications must compete for the same window, in which they use a window manager that is very different from NeXTstep. No special NeXT features, such as user-programmable keyboard equivalents, work within this X window. If you hide this window, all of the X applications hide. A better, but more complex approach, would be to have each X application create its own NeXTstep window using NeXTstep's window manager.

In a future version, Pencom plans to support NeXT pasteboard/X clipboard text sharing as well as a 12-bit color version for the NeXTstation Color. It also plans to unbundle the development tools, since many users would want just the runtime environment.

Overall, co-Xist is the best solution today to interconnect NeXT with X. It is well produced and provides a much-needed bridge between these two environments.

by JOE BARELLO



The co-Xist window is the X11 environment in the NeXT workspace. The X11 system includes an extensive set of sample X programs. The Motif window manager provides the "look and feel" features to move, resize, zoom, and kill programs.

co-Xist

●●●●

An excellent port of the X11R4 window system and Motif 1.1 to the NeXT computer. This is the best solution today to bridge the gap between NeXT computers and X environments. Documentation is limited.

$249 for co-Xist; $100 for Motif
$50 for documentation
$379 for all three

Pencom Software, 9050 Capital of Texas Hwy. N. # 300, Austin, TX 78759. 800/736-2664

outweighed by the outlandish $9 per-disk price, no one has ever gone wrong betting on the need for more storage.

by RICK REYNOLDS

PLI SuperFloppy 2.8

●●●

An external floppy drive for any NeXT, based on the same technology used in NeXT's own internal floppy drives. Early problems with shipping drives seem to be solved, and the new units are working simply and reliably.

$499

Peripheral Land, 47421 Bayside Pkwy., Fremont, CA 94538. 415/657-2211, 800/288-8754, 415/683-9713 fax

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WordPerfect 1.0.1

Barlow: I was wary of WordPerfect for the NeXT from the moment I heard it existed. WordPerfect for the PC is easily the most counterintuitive software since Dbase III, and owes its success entirely to the placid presence of 700 Latter-day Saints manning support lines in Orem, Utah. These sweet souls will hold your hand all day while you make your labyrinthine way through 48 completely anti-mnemonic function-key combinations. Without its angels, WordPerfect would have died an appropriate death years ago.

Given my suspicions, WordPerfect for the NeXT is, in some ways, a pleasant surprise. It makes full use of both the graphical interface and the NeXTstep environment. And it is an extremely powerful piece of software. With a few glaring exceptions, if something can be done by any word processor, WordPerfect can do it, and far more fluidly than its text-based siblings.

Further, except for drawing tools, it supports most of the major functions of a big-ticket page-layout program, including kerning, auto-hyphenation, up to 26 (!) columns in newspaper or parallel format, sidebars, and incredibly slick (and speedy) graphics placement and wrap-around. Anyone who says there's no real word processor for the NeXT is uninformed.



BARLOW & LAVIN
Our reviewers are all thumbs over recent product releases.
★

And yet, there's a lot about WordPerfect for the NeXT that meets my worst expectations. It was, after all, made by a company which has proven itself tone-deaf to design. Perhaps trying to kick their hideous fascination with function keys, the folks from Orem have devised a menu structure that's a recipe for carpal tunnel syndrome. It's like mousing one's way through the Amazon watershed.

WordPerfect is also missing some absolutely critical features, like (can you believe it?) an Undo command. One can undelete but not undo. Not only that, it takes the isolationist position that the only files one might need to read were generated by WordPerfect on some other platform. It will read RTF files created by WriteNow, but not those created by Word for the Mac (including Word files which have been converted to WordPerfect by MacLink Plus). It won't save in any exportable format but ASCII.

And it really seems buggy to me. The styles are quite perverse in the whimiscality of their application. Sometimes they convert the highlighted text, sometimes they convert the whole document–even if they are specifically designed not to. If you've got a lot of fonts, loading the first document of a session will take about three minutes. (And don't even consider using it with an '030. The Law moves more swiftly.)

I've saved the worst for last: They don't have the toll-free number for NeXT that's offered for other platforms, and both of the NeXT support people in Orem (there are only two) were out having children during a recent week. My thumb is perfectly horizontal on this one.

Lavin: **Come on John, you're trashing a great program. Any bugs you saw were probably before the March 18 in-line release, which WordPerfect Corporation gives free for the asking. (Any reader who has an earlier release should put down the magazine, call WordPerfect, and then come back to reading this.) I also understand some of your problems, but often that's not a bug–it's a result of having hidden tags in the text.**

Any negatives are more than outweighed by great features: the columns, the graphics handling, and the company's service attitude and follow-through. Pay money for WordPerfect and you can be assured that whatever you don't like now will be fixed. I didn't like it either five years ago on an 8088 PC, but look at the NeXT version. No Alt-F8! There is a god.

FrameMaker 2.0D

Lavin: Ick. Frame has the feel of the mainframe systems of my grade school days. And not the fun mainframe systems, either. Yes, I know that Frame is a very strong program for what it does (it gets four cubes elsewhere in this issue). I just don't like its inflexible approach to frame-based page layout or its rigid cross-platform homogeneity.

Because FrameMaker is exactly the same across all platforms, I feel like I'm using a terminal hooked up to the least-interesting machine it runs on. Frame-based page layout is best suited to long, technical publications, but surely just a little wrapping of text around graphics couldn't be that hard.

There is lot to be said for taking one thing and doing it well, but Frame is all there is right now on this platform and a few concessions would make all of our lives a little easier. Maybe I'm is so frustrated because Frame Technology is so obviously competent that it really could do more with the NeXT product.

Barlow: **I agree with you on this one, Dan. If I were a nuclear physicist writing a long book about the first two seconds of the universe, I would find FrameMaker exactly the appropriate tool. Its formulaic functionality, its austere precision, and its cosmic scale would be both practical and symbolically right. My own texts are of a generally more whimsical nature. This thing has the heft and sophistication of a warhead. And it's just about as intimidating.**

Create! 1.0

Barlow: In marked contrast to NeXT products from such lumbering industrial golems as Lotus, WordPerfect, and Frame are the fruits of a new tribe of loincloth-and-machete developers who seem to be gathering their yurts around the NeXT. The best and most prolific of these is a dirt hacker from New Mexico named Andrew Stone. This guy (and a few others like Glenn Reid of RightBrain Software, whose TouchType is a marvel of intuition) represents a whole new breed of software designers who understand the incredible capacities of the NeXT as a development engine. His work, which includes TextArt, the soon-to-be-released DataPhile (a serious rival to FileMaker among graphical flat filers), and Create! is clean, extraordinarily self-documenting, and powerful. He is also fast. He and his hackerette colleague Kris Jensen can literally revise and improve large programs overnight. (I made a suggestion for a feature to be included in DataPhile, and the next day, Stone e-mailed me a new version of the program that included it!)

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At the moment, Stone Design's flagship is Create!, a combination text enhancer, graphics enhancer, and PostScript drawing program of the Illustrator class. Where Adobe's heavyweight has capacities Create! doesn't include, it can't touch Create!'s abilities to mess with letters. Nor does it do anything with the same ease. Without a manual I was making this sort of thing minutes after loading the program:



I'd show you more, but I'd only demonstrate an embarrassingly dim eye for graphic design. Nevertheless, if I can do this, imagine this tool in the hands of talent.

Create! has only one liability: Many hours will be wasted as knowledge workers dink around with Create! instead of building the spreadsheet empires they are paid to do. But if your job ever requires you to do anything visually creative with text and graphics, there is nothing easier nor mightier on any platform.

Lavin: **You left one developer off your list, John: the wizards of Lighthouse Design. Together with Reid and Stone, these are the triune masters of graphics and a walking set of competitive advantages for the NeXT platform. They prove that PostScript is a powerful language, not just a way to print.**

Another thing you didn't mention is that Create! is excellent for single-page layout as well. It is the ideal tool for super-creative flyers, flip sheets, overheads, or presentations. Create!'s capabilities exceed a normal person's creativity. No bumping into the ceiling on this one.

NeXTmail 2.0

Lavin: I really love NeXTmail; it's where I spend my life now. Even though I've had e-mail of various sorts for ten years, NeXTmail has made the difference between a lifeline to the world and a casual source of contact with friends. Though obviously a lot of this has to do with my nifty connection to Internet mail that dials every half hour, I give a lot of credit to Bryan Yamamoto and his excellent mail program.

The basic interface is easy to use and it just works. Being able to drag files, folders, voice and graphics into and out of your mail messages is a boon that makes standard UNIX mail look sick. Oops, hold on a second, mail just came in. I can tell because the mail icon on my dock changes no matter what application I'm using. I may have a few nits with the interface, but it's Mail's excellence that makes these small shortcomings so apparent.

Barlow: **I live in NeXTmail, too. Unfortunately, I have a number of quibbles with the interface, all of them fixable. For example, you should be able to reply to a message with a simple command key combination. Instead, you have to perform a yogic series of mouse clicks. As with some other NeXT software, one reaches for the mouse far too often. The system for maintaining frequently used addresses is almost completely useless. Finally, I want a better search function that would allow me to search an entire mbox for a text string. As it is, NeXTmail only lets me search either for the names of folks who've sent me mail or through whatever message is in the active window.**

Despite these qualifiers, I am addicted to NeXTmail. I find that when I log into a straight UNIX system with the Terminal and have to use standard UNIX mail, I feel suddenly disabled. Considering the alternative, my thumb is up.

NeXT Support

Barlow: When I first encountered NeXT support, I bounced right off it. With a peremptory wave, they sent me off to BusinessLand (where I was then told that I would have to pay $1000 up front for advice on a machine they obviously knew little about). This put me in mind of Macintosh "support." The apple don't fall far from the tree, I thought.

Then I got desperate. Unlike the Mac, the NeXT is a serious computer and not something you can figure out by yourself unless you're a lot smarter than I am. I found a couple of princes from BaNG (Bay Area NeXT Group), Rick Reynolds and Robert Neilsen, who were extremely helpful, but I soon ran into problems even they couldn't solve. So I took another run at NeXT support, resolved to perform whatever manipulative acts of social engineering were necessary to get me through the door. Both cunning and gall were required. It's easier to get an audience with the Pope.

But when I got through, I encountered something amazing: the most patient and knowledgeable support staff I've ever dealt with. These people are remarkable. I've either talked to or exchanged e-mail with about seven of them at this point, and I found them uniformly smart, good-natured, resourceful, and hard-working. They go at my every problem as though they were killing snakes, and they don't quit until the problems are solved.

If NeXT has any sense of self-preservation at all (and one wonders sometimes), they should unleash this secret weapon and make NeXT support available to everyone who buys a machine. As I said elsewhere, WordPerfect managed to make an almost unuseable program the most popular software in the world on the basis of support alone. Think of what great support could do for a great machine.

Support: Support policy:

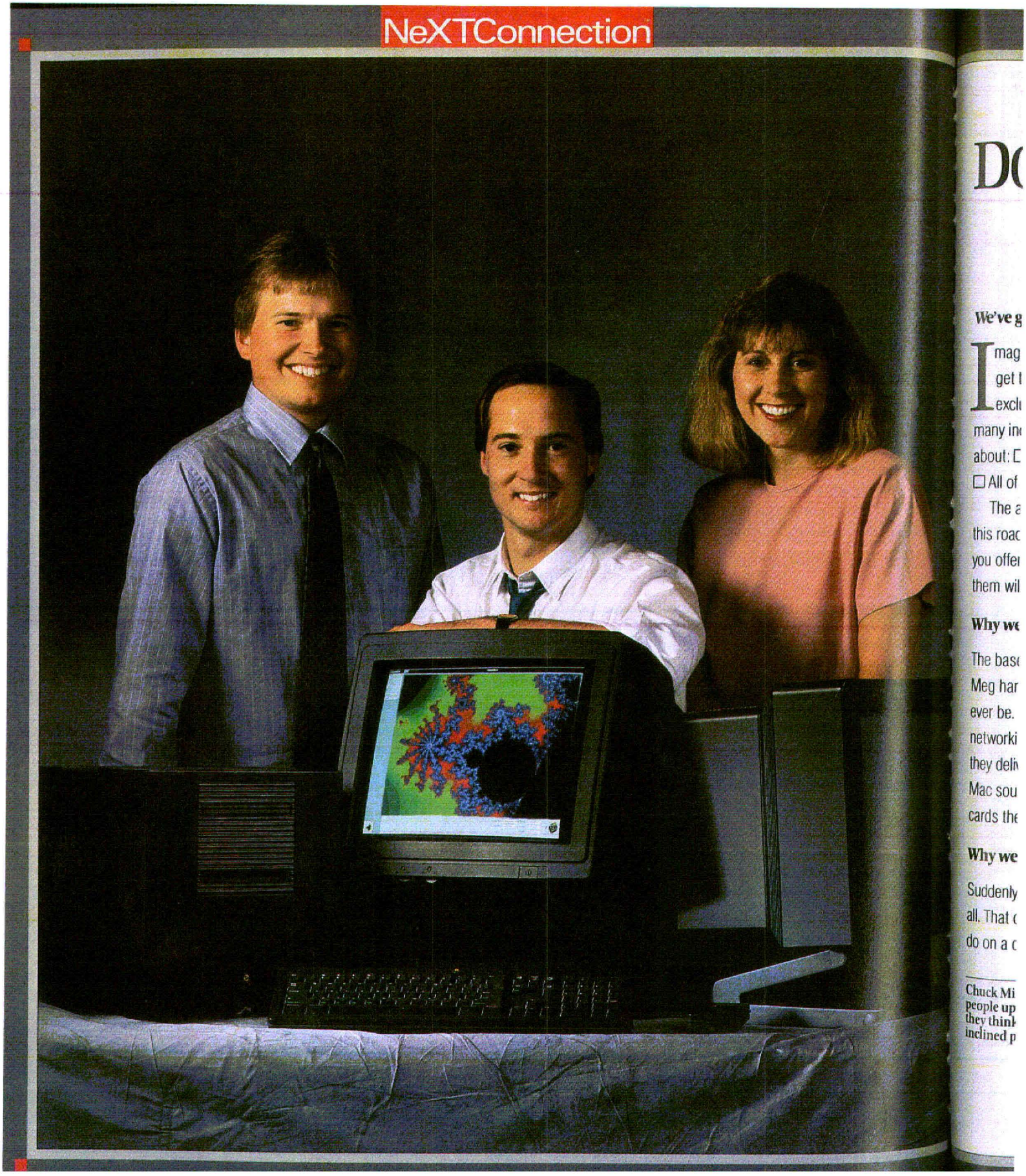
Lavin: **It's true. The tech support people at NeXT are better qualified than the product development people at most companies. One difference is that NeXT views its tech support as a front end for its engineers. If they don't know the answer to a question, then they call the guy who wrote the code.**

But this is just a tease for the average NeXT user. You're a famous songwriter and I'm an editor of *NeXTWORLD*. The average NeXT user has to work with his or her local dealer. In the case of B'Land, this was a joke. In the case of the new dealers, the jury is still out. Currently the only way to get to NeXT's elite support group is to buy a $2500 support package for a year, but you must be a graduate of the $1500 System Administration class to even be eligible to buy it. Both are well worth the price, but I agree that NeXT is missing a real opportunity. Toll-free tech support would really differentiate NeXT.

Support: Support policy:

The coldly analytical JOHN PERRY BARLOW *writes lyrics for the Grateful Dead and is co-founder of the Electronic Frontier Foundation. The irrational* DAN LAVIN *is a senior editor at* NeXTWORLD. *They both love getting e-mail: jbarlow@nextworld.com and dlavin@nextworld.com.*

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DOES THIS PICTURE LOOK FAMILIAR?

(WE'VE BEEN DOWN THIS ROAD BEFORE.)

We've got Connections.

Imagine this: in a small New Hampshire town, a few people get together and create an entire mail order company devoted exclusively to a revolutionary personal computer, even though many industry "experts" say it will never take off. We're talking about: ☐ PC Connection ☐ MacConnection ☐ NeXTConnection ☐ All of the above.

The answer is "All of the above." You see, we've been down this road before. Because we know—from experience—that if you offer people a truly new level of computing power, a lot of them will choose it.

Why we like NeXT: the system.

The base-level NeXT Station—040 processor, 8 Meg RAM, 105 Meg hard drive, etc.—is more powerful than most micros will ever be. Huge applications, complex graphics, multitasking, networking—that's what NeXT computers were made for. And they deliver. As fast—and often for less money—than a PC or Mac souped up with all the extra memory and accelerator cards they can handle.

Why we like NeXT: the software.

Suddenly developers are able to create applications that do it all. That do exactly what you always thought you'd be able to do on a computer as fast as you hoped you could do it. Like *Lotus Improv* with its multi-dimensional spreadsheet views and *Adobe Illustrator* with its true Display PostScript screens and WYSIWYG output. Plus installing software is really easy. Multitasking is really straightforward. And networking? We had our first network of four NeXTs operational in under two hours.

Why we like NeXT: the support.

The people at NeXT listen. And respond. In September 1990, they reacted to criticism of the original cube by announcing a new line of machines with 040 processors, internal 2.88MB disk drives, a new operating system, and 2 different color options. All of these systems shipped within 7 months. In fact NeXT is now shipping the machine that the PC (with Windows) and the Mac (with System 7) are trying to be. And many Mac and PC users are starting to make the switch.

So where do we go from here?

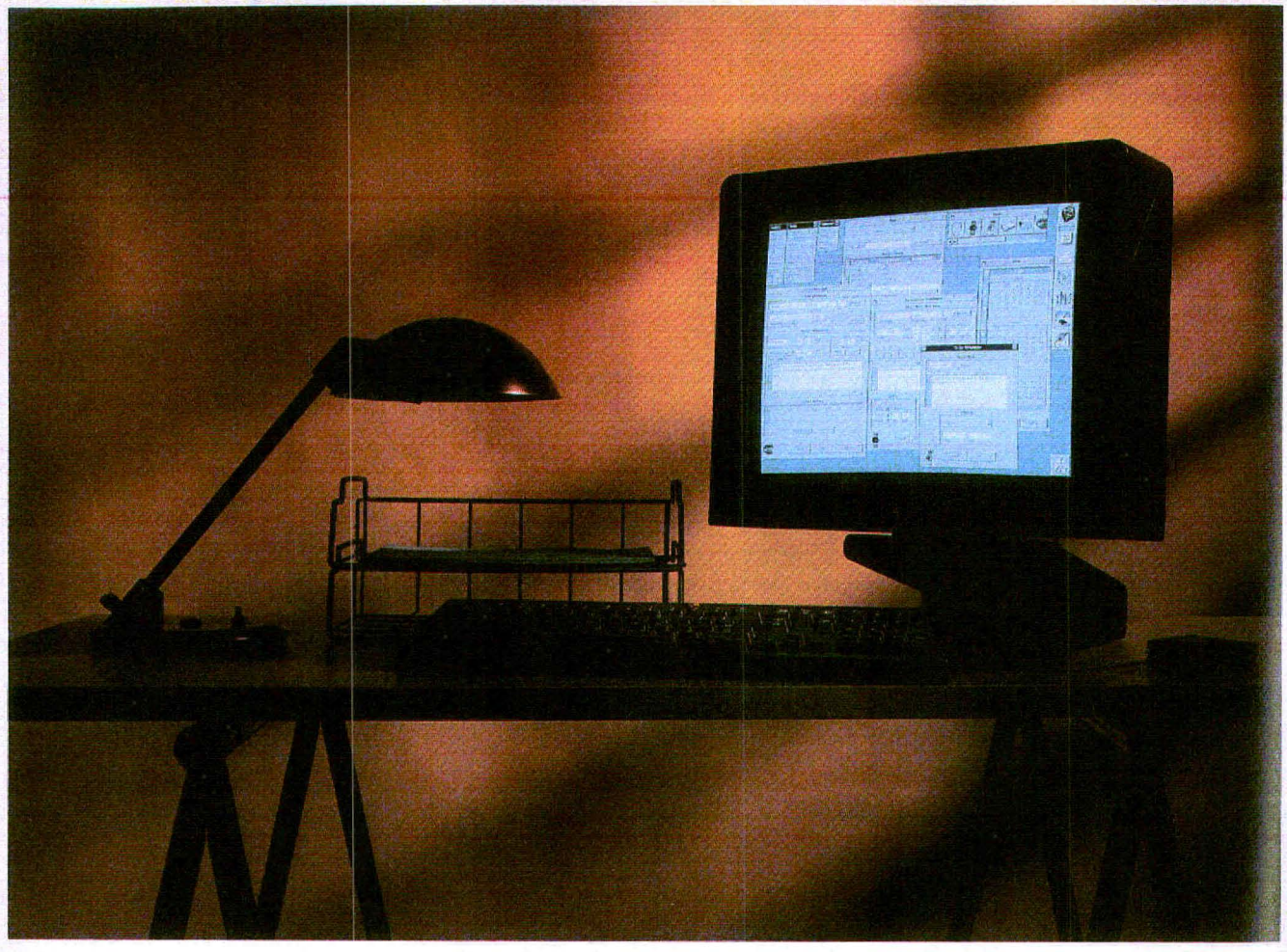
At NeXTConnection we offer a combination of low prices, super-fast shipping (in stock orders phoned in by 3:15 a.m. go out that same night for next day delivery—just $3) and a toll-free number for orders and technical support.

Like you, we're still waiting for a few more good programs. Like one that lets you run Mac applications directly, and a good all around communications package, a basic accounting program and more. But they're all in the pipeline and as soon as they're ready, we'll have them for you. Just like we did for the PC and the Mac. Which is why if you own a NeXT, we'd like to be your Connection. Now. And for years to come.

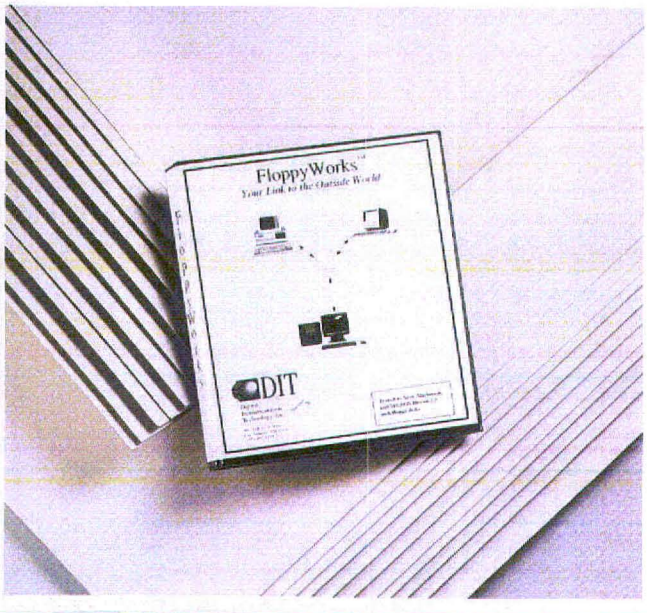
Chuck Milliken, Jerry Evans, and April McGuire are just a few of the people up here who will gladly talk to anyone anytime about why they think NeXT is the greatest technological innovation since the inclined plane.

SIMSON00000709

NeXTConnection



DIT DOES WONDERS WITH DATA.



ONDUTY

The personal information manager for NeXT users. OnDuty incorporates all aspects of a personal information manager into one powerful, easy-to-use program. OnDuty gives you unprecedented flexibility in linking important names, telephone numbers, addresses, contact information, appointments, to-do items, and notes. A powerful lookup facility puts all your data at your fingertips, and its server-client database allows multiple users.

OnDuty has all the features you need to get your business day under control: a sophisticated and integrated calendar, a To-Do Manager, a Contact Manager, an Appointment Manager, a Calculator, and a Notepad. And when it's time for an accounting, OnDuty is there with a full range of ready-made reports. A data import and export facility is included.

Digital Instrumentation Technology

8657 OnDuty 1.0 $209.

FLOPPYWORKS

Read, write, and format Mac diskettes? Not only can you do that, but **FloppyWorks** also lets you transfer files easily between Mac, MS-DOS, NeXT, and OS/2 diskettes—720K, 1.44 MB, and 2.88 MB—making it an essential utility for NeXT users who need access to PCs and Macs. File transfers are a breeze—just point and click between two browsers showing files on the hard and floppy disk. And file transfer filters provide a simple means of adjusting data files for different word processing, spreadsheet, database, and graphic formats. Buy FloppyWorks alone or bundled with *CubeFloppy 2.9*, DIT's external floppy drive.

Digital Instrumentation Technology ... 1 year warranty

8656 FloppyWorks $185.

8661 FloppyWorks *(with CubeFloppy 2.9)* 579.

SIMSON00000710



GET MORE GRAPHIC THAN EVER BEFORE.

ADOBE ILLUSTRATOR

A must for anyone designing a page on a NeXT. With **Adobe Illustrator**, you can start from scratch, create grids for precision drawing, "Auto Trace" existing artwork (including color shades and hues), and/or import EPS and TIFF images. Enhance your visuals with airbrush, contour, highlight, and fill effects using as many colors as you like.

Enter and edit text directly, incorporating various typographic sizes, styles, and colors; and take advantage of sophisticated editing features like text wrap, kerning, vertical shifting, and custom letterforms. Illustrator uses NeXT fonts and color panels, so specifying type and color is easy (PANTONE support, too!). You can edit pages in "preview" or "preview selection" mode—you'll see changes instantly. And NeXT services like Mail or Librarian simplify file transfers and text searches. Overall, it's the ideal tool for business graphics, knock-out ads or flyers, and/or complex technical illustrations.

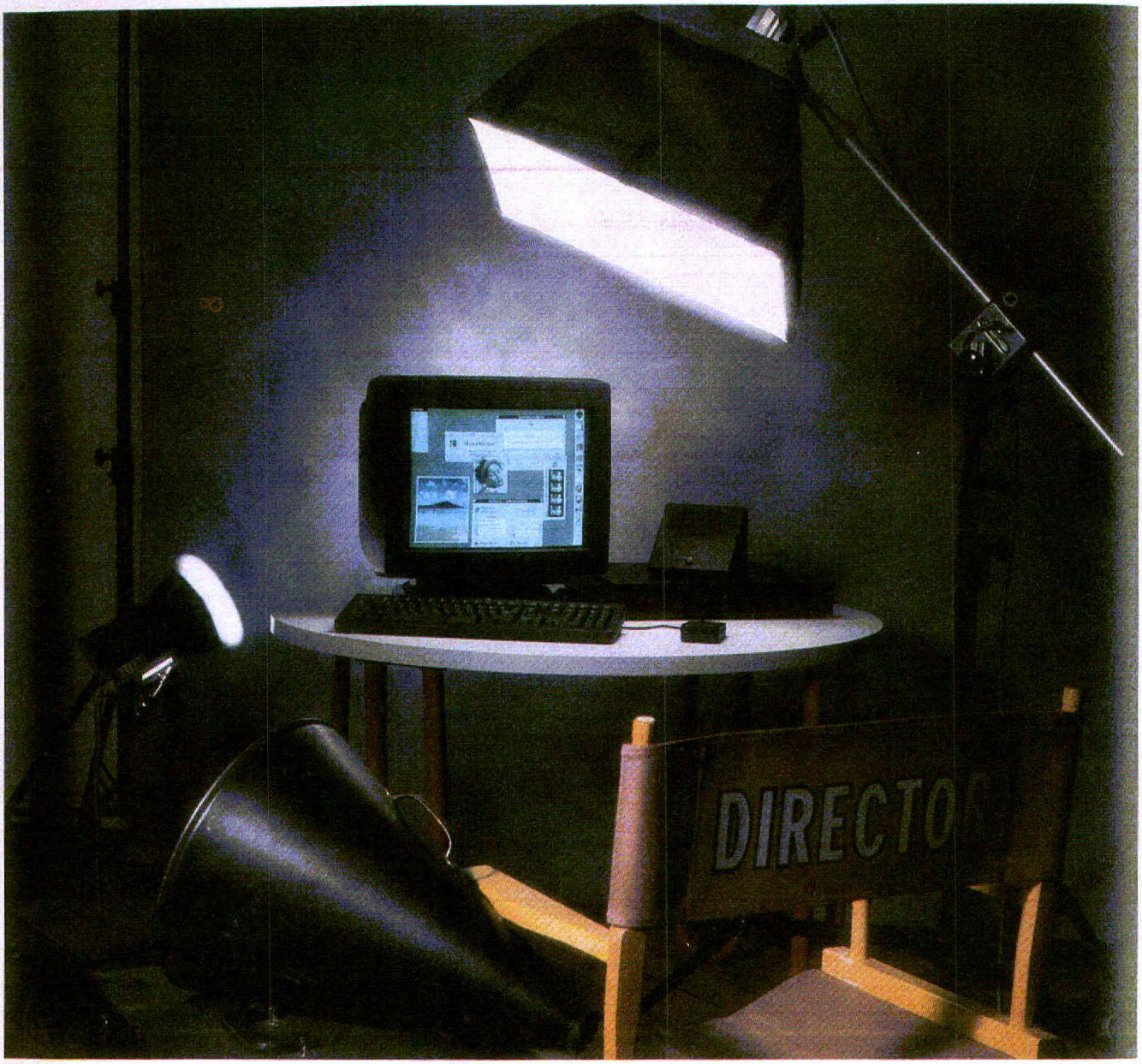
Also from Adobe, the new **Adobe TouchType** gives you expert typography in an easy-to-use interface. It's the perfect complement to Adobe Illustrator and all other applications that use or need type. Features include powerful kerning, a font selector that allows you to choose a typeface by viewing its design (rather than a list of names), and the ability to position letters anywhere on the page. And to spruce up your type collection, try the **Adobe Plus Pak** (22 popular Type 1 PostScript Fonts) and/or **Adobe Type Set Packages** (#1 and #2 are display; #3 for text faces) for big savings over buying individual fonts.

Adobe

1827 Adobe Illustrator 3.0 **$459.**
9741 Adobe TouchType 1.0 **175.**
9765 Adobe Plus Pack 1.0 **199.**
1832 Adobe TypeSet 1 . **65.** 1832 Adobe TypeSet 2 . **65.**
1834 Adobe TypeSet 3 **129.**

Call 1-800/800-NeXT to order.

SIMSON00000711



MULTIMEDIA IS THE MESSAGE.

MEDIASTATION 1.53

Lights, camera, action, sound, and more. Welcome to the wonderful world of **MediaStation**—the integrated multimedia database and authoring system. This multitasking, multiuser application package lets you capture, process, organize, store, and present high-resolution graphics, CD-quality sound, animation, video, and text. MediaStation was developed for folks who archive and retrieve media and who create computer-based training, interactive presentations, electronic storyboards, and dynamic multimedia libraries. Additional uses are possible in medical imaging, facilities management, human resources, and other fields.

In MediaStation's *Format Mode*, you design the look of your graphic interface and multimedia applications. In *Enter Mode* MediaStation accepts scanned images (and TIFF and EPS files), digitized video and stereo sound, and text files. Powerful authoring tools let you edit and annotate images, sound, and text and create cell-by-cell animation. Completed entries are equivalent to database records and can be indexed, searched, and sampled in *Browse Mode*. The *Presentation Mode* with its Script Maker feature allows you to create and play back a desktop presentation, and *Forms Mode* helps you create and save forms used to print reports with images and text.

MediaStation is fully networked. Recommended storage devices include read/write optical disks, CD-ROM, and network file servers. It also supports high-resolution scanners, DSP audio devices, video recorded with *DigitalEye*, and export of multimedia to other applications. It's showtime on the NeXT.

Imagine, Inc.

1396 MediaStation 1.53 **$829.**
1397 MediaStation 1.53 *(5 pack)*..... **3129.**
1398 MediaStation 1.53 *(10 pack)*..... **9379.**

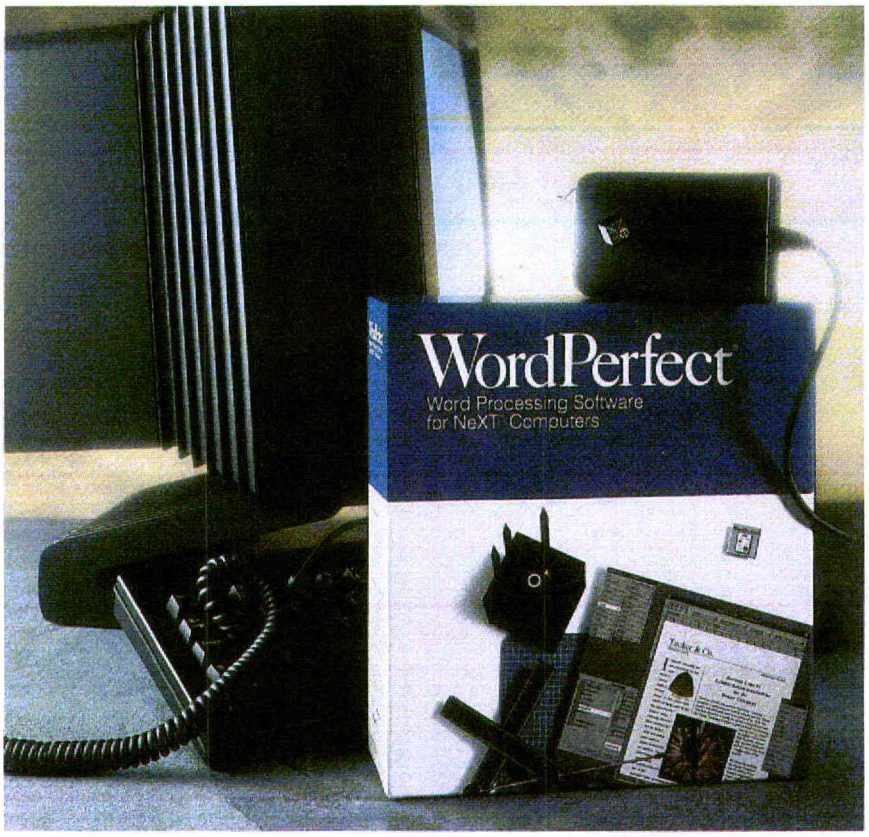
SIMSON00000712

WordPerfect

The NeXT step in word perfection. If you want to concentrate on your writing and not your software, **WordPerfect** is just the ticket. Whatever form your writing takes: professional newsletters, brochures, correspondence, reports, or anything you care to create, WordPerfect has the features and ease of use that help keep your thoughts flowing. This full-featured word processor offers: columns (newspaper and parallel), powerful macros, merge (making mass mailings simple), table of contents, indexing, footnotes/endnotes, and much more. Questions? Ask the Digital Librarian or consult the on-line reference manual. When it's all said and done, check your work with the 115,000-word speller, or explore better wording with the comprehensive thesaurus.

WordPerfect easily integrates text and graphics, so you can turn newsletters or direct mailings into head-turners (and page-turners). You can place graphic images complete with captions or borders anywhere on a page (inserted in a line of text, tied to a paragraph, or placed in a header or footer) and scale, move, and rotate them in myriad ways. And to protect your work, the automatic timed backup will save your work at regular intervals. This is full-featured word processing for the NeXT.

WordPerfect
8818 WordPerfect 1.0.1 **$329.**



Squash!

The smaller the better. With **Squash!**, you can compress folders and files to a fraction of their original size. Copies of folders can be compressed onto multiple floppies, making quick backups of large folders a snap. Files can be compressed in Workspace by pressing a single command key and decompressed and opened with just a double-click. You can even have it find and squash old files at night so you wake up with more disk space in the morning! It's an inexpensive way to increase your available disk storage and backup your important data to floppies.

Agog, Inc.
1476 Squash! 1.0 **$79.**
1478 Squash! 1.0 *(10 pack)* **699.**



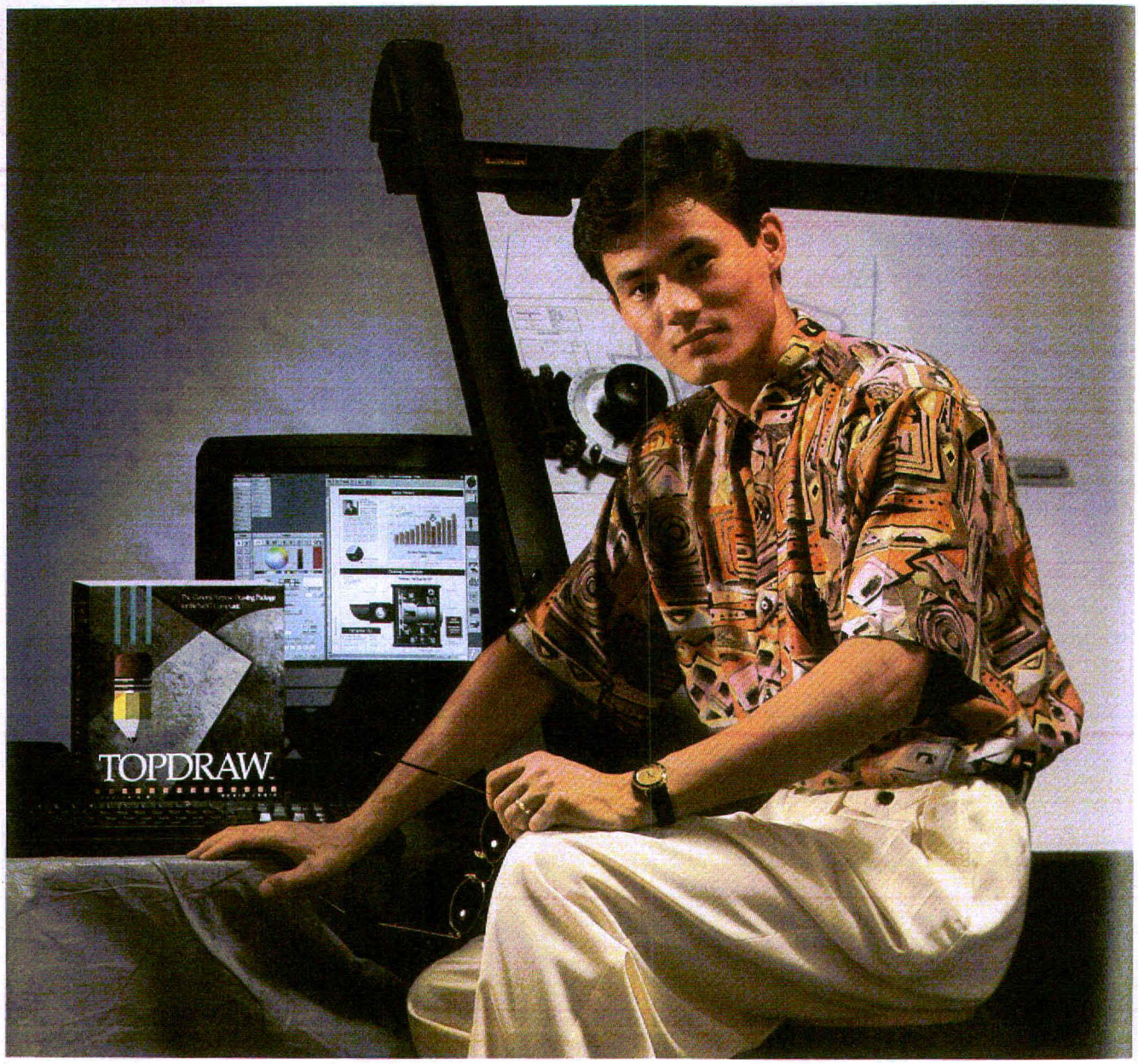
Marble Teleconnect

Dial in to your network. With **Marble Teleconnect**, all the resources of a remote network (such as mail, peripherals, and databases) are available to the individual telecommuter or to the satellite office. It enables NeXT computers to run the Internet Protocol (IP)—and the thousands of software packages that depend on that protocol—over telephone lines. Teleconnect provides a significant improvement over conventional PC- and Macintosh-based communications packages, and allows NeXT users to enjoy the benefits of NeXT applications and multitasking. For example, the user can simultaneously transfer files, log on to multiple machines on a remote office network, and work with NeXT applications such as NeXT Mail, Lotus *Improv*, and *WordPerfect*.

Marble Associates, Inc.
1012 Teleconnect **$249.**



SIMSON00000713



POWER DRAWING FOR EVERYONE.

TopDraw

Graphics for every skill level. Regardless of your artistic talents, you'll appreciate **TopDraw**'s comprehensive graphic tools and PostScript output. Casual users can create high-impact diagrams, charts, and graphs. For advanced designers, TopDraw provides sophisticated layout and illustration capabilities, including tools for importing, editing, and integrating continuous-tone raster images.

Select design objects to draw lines, rectangles, squares, circles, ellipses, arbitrary polygons, and smoothly curved shapes—all automatically. Shapes may be filled with spot color, shades of gray, or pattern then layered, scaled, rotated, "zoomed", and skewed. Graded tones, opacity control, and user-definable dash patterns and line width are also available.

Add text in any size, at any angle, within objects, or along any path. (You can cut and paste text from *WriteNow* and *FrameMaker*.) Change fonts, stroke width, spacing, justification, and margins for individual letters or complete paragraphs. And TopDraw lets you edit text even after graphic manipulation, making sophisticated effects easy to create and change.

TopDraw imports images from a host of scanners as well as PostScript, Encapsulated PostScript (EPS), Tagged Image File Format (TIFF), Maker Interchange Format (MIF), and Rich Text Format (RTF) image files. Scale, crop, skew, rotate, and adjust raster images for brightness and contrast before they're placed in layouts. And when you're ready to show your top-drawer TopDraw graphics, mechanicals and films may be output on a range of devices, from laser printers to sophisticated PostScript color image setters.

Media Logic

9987 TopDraw 1.0C. $479.

SIMSON00000714

Optical & Floppy Disks

Don't get caught short. One of the laws of computing seems to be that you never have enough blank disks when you need them. Well, whether you rely on 2.88 floppies or optical disks for your daily (and backup) storage requirements, we can keep you well stocked. **512 MB Optical Cartridge** are designed specifically for the 68030 and 68040 cube and have 256 MB available on each side for a total of 512 MB of storage per disk. For NeXT floppies, we have dependable **Toshiba 3½" ED Diskettes**. Just format and then fill them with all the application and data backups you need to run a nice, safe, secure operation.

Canon ... 90 day MBG
9811 512 MB Optical Cartridge *(MO-502m)* **$175.**

Toshiba ... lifetime warranty
9754 Toshiba 3½" ED Diskette *(Qty. 1)* **8.**
9755 Toshiba 3½" ED Diskettes *(Qty. 10)* **79.**



16 Meg Upgrade Kit

The more the merrier. Once you start multitasking a host of high-end applications, 8 Meg of RAM can start filling up real fast. That's when it's time to get a NeXTConnection **16 Meg Memory Upgrade Kit**. It consists of four 4 MB, low-profile, non-parity, 80 ns SIMM modules that are compatible with the 68030 and 68040 cube and the 040 workstation (monochrome only). You can install them yourself in the cube (and we provide toll-free tech support), but you risk voiding the warranty if you do so in the workstation so we recommend having an authorized dealer do it for you. Either way, it's the inexpensive fast track to more NeXT power.

Memory ... 2 year warranty
8911 16 Meg Memory Upgrade Kit **$895.**



DoveFax

Is it a fax? Is it a modem? Yes! Yes! Whether you've got a computer-generated file to fax or data to send, **DoveFax Desktop for NeXT** has the solution. In short, it's an external serial device featuring a 9600 baud fax modem and a 2400 baud Hayes-compatible data modem. The fax features true background operation, an on-line telephone directory, on-screen display of faxes, automatic answering, customized cover pages (with graphics and text), fax preview, and Display PostScript imaging. The modem can be used with a variety of communications services, telecommunications applications, and electronic bulletin boards. It's easy to install and use and, like all Dove products, is backed by a one-year warranty.

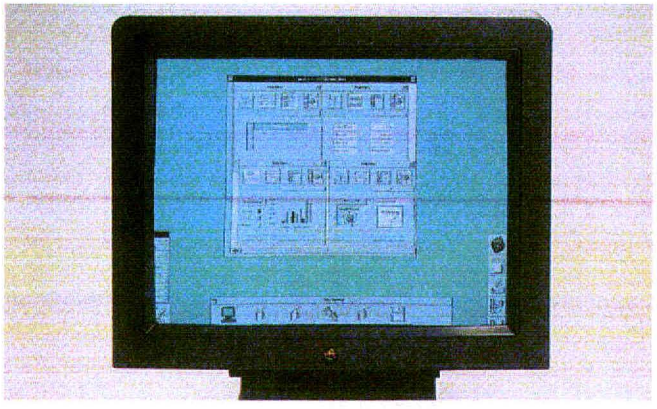
Dove Computer ... 1 year warranty
9356 DoveFax Desktop for NeXT *(includes 2400 modem)* **$395.**



OT Palettes

Increase your development power. And save money, too, by dramatically reducing programming time. Use **OT Palettes** 2.0, the first objects created by the only commercial custom palette developer for NeXT's Interface Builder. **SmartField** is an advanced text field formatting and character validation object. **Math** provides front-end development tools for *Mathematica*. **Graph** allows fully interactive graphs to be incorporated into custom applications. **Chooser** is a scrolling selection list. Call NeXTConnection for more information.

Objective Technologies
9345 [OT Palette: 2.0] SmartField **$650.**
9346 [OT Palette: 2.0] Math **650.**
9344 [OT Palette: 2.0] Graph **1259.**
9347 [OT Palette: 2.0] Chooser **429.**



SIMSON00000715



Peripheral Land Drives

Sophisticated storage solutions. PLI's **SuperFloppy 2.88** gives you the convenient high capacity of the latest drive standard along with complete read/write/format compatibility with 720K and 1.44 Meg disks. And it has a SCSI interface for easy connection to any NeXT. The **Infinity Turbo 40** won an Eddy award from *MacUser* because it combines the unlimited storage capacity of removable cartridges, the reliability of the SyQuest mechanism, and a 20 ms access time that rivals high-end hard drives. There's also a two-slot **Infinity Twin** model available. So whether you need a 100%-compatible 2.88 floppy or a super-fast 45 Meg removable-cartridge drive (or both), head for Peripheral Land.

Peripheral Land, Inc. ... 1 year warranty

8547 SuperFloppy 2.88 **$449.**
8893 Infinity Turbo 40 MB Cartridge Drive **829.**
8894 Infinity Twin 40 MB Cartridge Drive **1375.**



MapArt

Maps for desktop publishing and graphic design. Imagine over 5 MB of high-quality map graphics at your fingertips! With **MapArt**, you get a comprehensive map collection that makes it easy to create attractive map graphics for brochures, newsletters, and presentations. Customize maps with *Adobe Illustrator* or import as background images in most NeXT applications. Maps feature country/state borders, latitude/longitude lines, and country/city names. Since each feature is a separate object, you can select areas, modify text, and add drop shadows and graphics to create your own design. MapArt includes four world maps, 12 regional maps of all world continents, plus detailed maps for 24 major countries that show state/province boundaries.

Micro Maps

9276 MapArt 1.0. **$95.**



Objective DB Toolkit

Get friendly with SYBASE. A boon for developers, **Objective DB Toolkit** fills the gap between the SYBASE database engine and applications. This versatile object library provides higher-level access to the Structured Query Language and Links the SQL Server with Interface Builder. It offers extensive templating for TextFields and mapping of palette objects to data types, letting you add functionality to data types. The Toolkit accommodates text, image, and sound data and supports pop-up lists as well as text, buttons, and slider arrays.

Field definition requires no programming and field characteristics may be modified dynamically. Each window and field may be set up to trigger specific database access or processing commands. The Toolkit also provides automatic data transfer to screen fields and generates data portions of SQL insert and update statements.

For easy manipulation of sound messages, you can associate a sound interface with database variables. And a browsing facility—loaded directly from an SQL statement—can print browser contents with no programming required. And fully multilingual applications are easily generated.

Professional Software

9357 Objective DB Toolkit 2.0 **$895.**

SIMSON00000716



OPEN THE DOOR TO DOS.

SOFTPC

It's a PC-on-a-disk! Now you can run any MS-DOS application on your NeXT system with **SoftPC**, the software-based PC emulator. If you depend on a specialized PC program or PC datafile—or have PC-based co-workers—SoftPC can make platform hopping simple and fast. It'll also help you protect your investment in DOS software and training. As *NeXTWORLD* said, "This undertaking is so important and so difficult, and SoftPC succeeds so well at it, that SoftPC ranks as one of the most important programs for the NeXT."

SoftPC duplicates an IBM PC/AT with 80286 and 80287 processors, offering C: and D: drives, MS-DOS 3.3 (you can install 4.0), and support for EGA and CGA video in monochrome and color. There are two printer ports and two communication ports that can be directed to NeXT serial ports or to any UNIX device, process, or file. SoftPC will even transform your NeXT mouse into a Microsoft mouse on the screen.

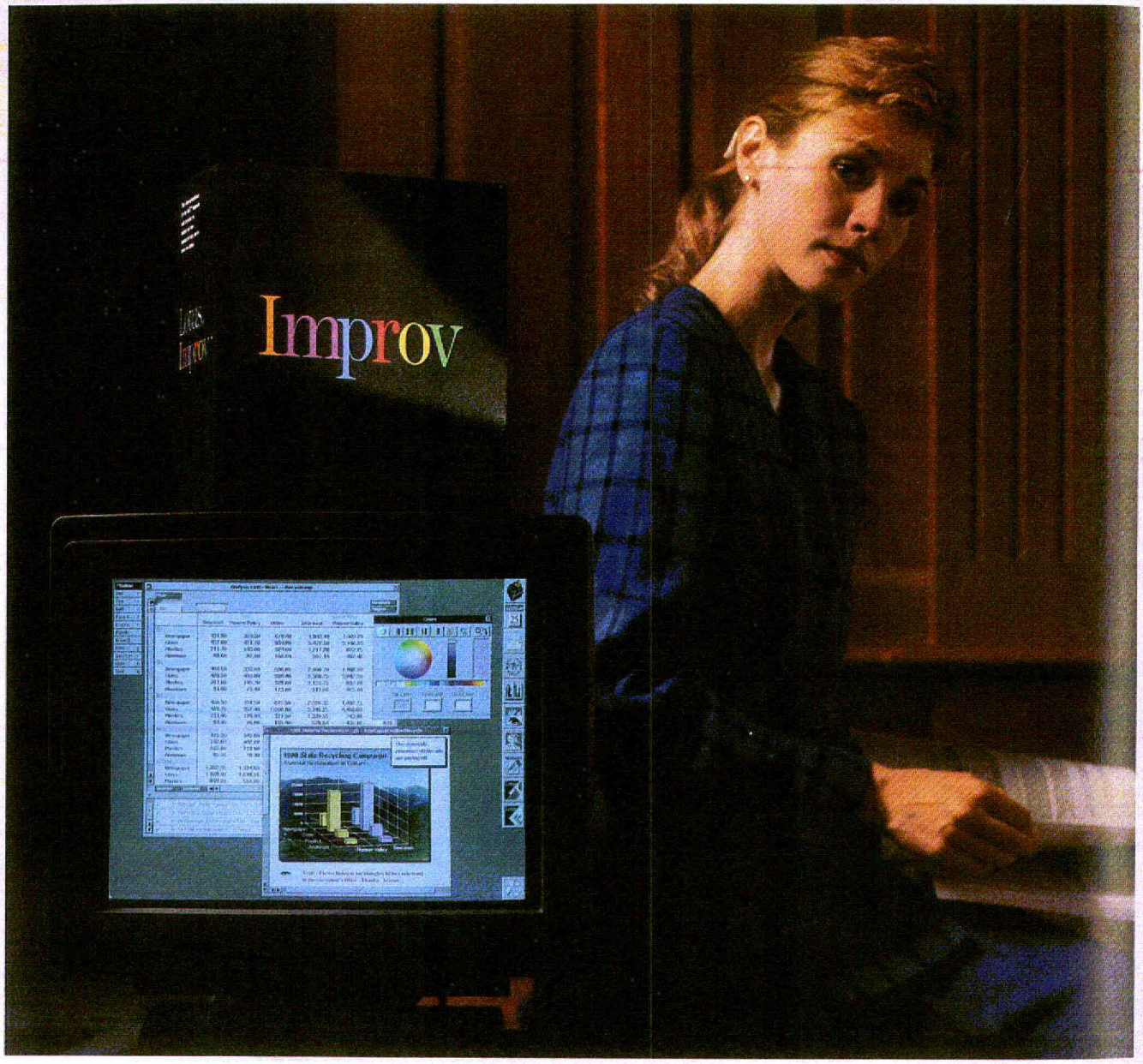
SoftPC's special features give DOS applications a boost in performance and versatility. NeXT and DOS software can run side by side and share files as easily as copying them. NeXT modems, printers, floppy drives, CD-ROM, scanners, and other peripherals are available to your PC program. And for mega-applications, SoftPC opens up an astounding 32MB of RAM to your DOS programs.

While SoftPC will work on any system running NeXTstep 2.0, a 68040 processor is recommended. Get the power of the NeXT with the rich application library of DOS—isn't that what you've been waiting for? Well, you can have it all with SoftPC.

Insignia Solutions
1456 SoftPC 2.0 **$329.**

Call 1-800/800-NeXT to order.

SIMSON00000717



LOTUS REINVENTS THE SPREADSHEET.

LOTUS IMPROV

Look at your data in a whole new light. What happens when you give the creators of the world's best-selling spreadsheet an 040 processor, 8 Meg of RAM and let them improvise to their heart's content? You get **Lotus Improv**, a revolutionary spreadsheet for analyzing, viewing, and presenting your data in ways never before possible.

The unique dynamic views feature of Improv lets you see the same data in multiple ways to explore data relationships and prepare targeted reports. Just use the mouse to rearrange your spreadsheet and get a whole new view instantly, without any re-keying. You can actually work with 12 different dimensions of data at once, displayed in 2D or 3D format.

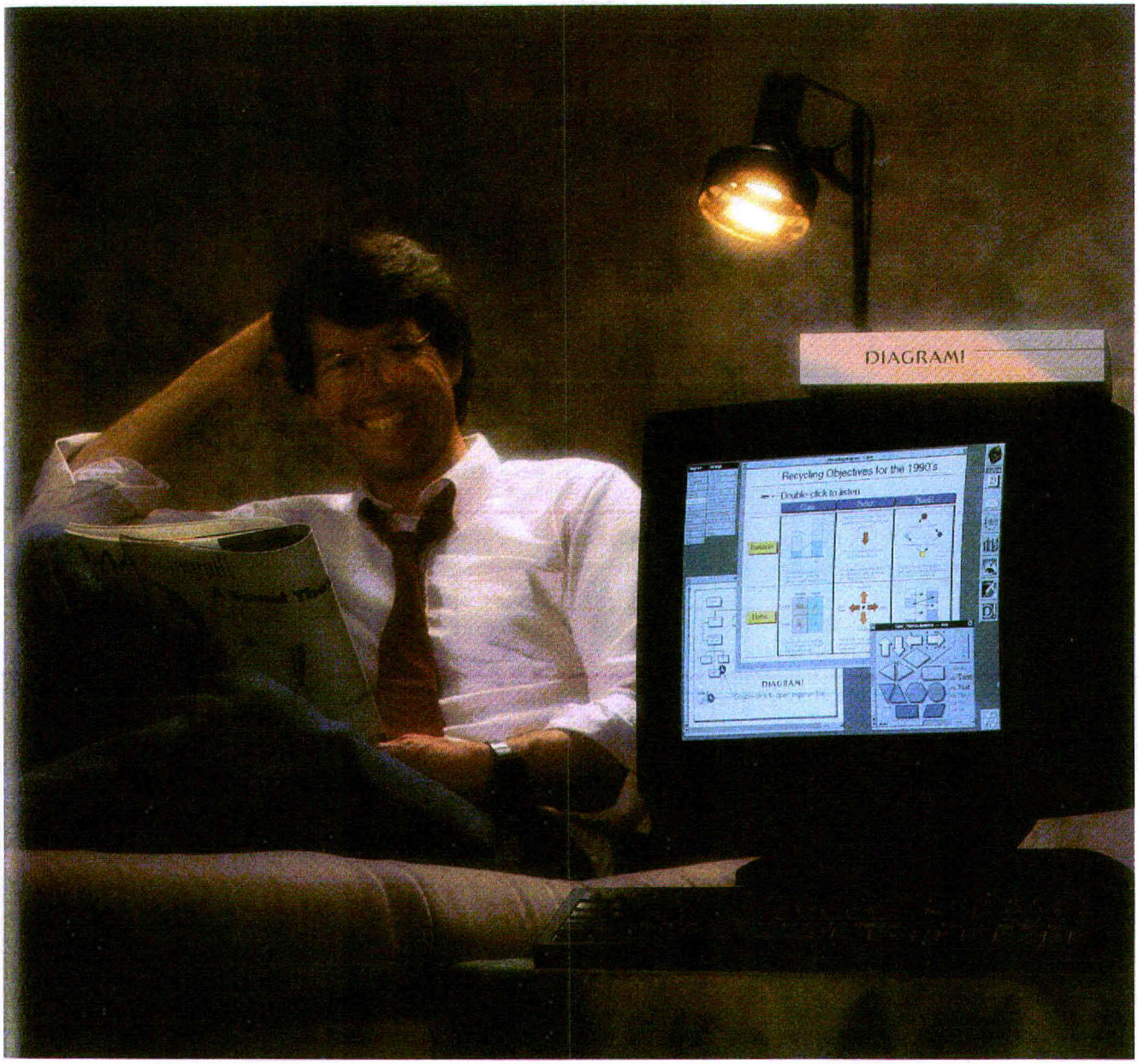
Improv lets you use plain English to define cells and create formulas (e.g., "Dollars = Tons x 12.5"). So your spreadsheets document themselves and are easy to modify or re-use. And for complex formulas, you can call on a host of built-in *Lotus 1-2-3*-style functions. All of which makes it easy to build spreadsheets from scratch. And you can also use the extensive collection of prepackaged templates and/or import existing *1-2-3* files directly.

Ready to show off your stuff? Improv lets you combine graphs, texts, images, and even sound with stunning clarity and resolution that takes full advantage of NeXT.

How good is it, really? *Byte* (10/90) wrote, "Improv knocked me out." *PC World* (11/90) called it "a stunningly simple approach to organizing complex data." And *What Micro? Magazine* (UK, 4/91) awarded it "Most Innovative Product 1990."

Lotus Development
9794 Improv 1.0 $549.

SIMSON00000718



GRAPHICS FOR PEOPLE WHO USE THEM EVERY DAY.

DIAGRAM!

Diagram! packs graphics power and production. Do you use graphics in your business? To get your message across fast and with high impact? **Diagram!** is a new kind of presentation graphics package that lets you combine drawings, data, sound, and even files from other applications quickly and effectively. Just double-clicking in your Diagram! drawing will open *Improv* spreadsheets, reveal *WordPerfect* or *FrameMaker* documents, or play back voice recordings. Setting links is as easy as dragging in a file and dropping it!

Diagram! is a full-featured graphics application with all the extras to make drawing, revising, and presenting information a snap. With customizable symbol palettes, you're freed from switching back and forth between conventional tools. Instead, you point to shapes and drag them into your document. If you don't see what you need, modify your palette and you've instantly customized Diagram!. Overall, it's one of the biggest innovations in drawing technology since the Macintosh.

In addition, once you've drawn a line between objects, Diagram! takes over: "rubberbanding" lines to automatically maintain organizational charts, process flows, or decision trees—any structured drawing. That's right, this is a graphics program designed for people who *use* them every day.

By the way, you don't have to be in business to enjoy the power of Diagram!— students and universities have proven to be big fans also. Ask about the special educational discounts available.

Lighthouse Design, Ltd.
8621 Diagram! 1.0 **$339.**

Call 1-800/800-NeXT to order.

SIMSON00000719

NeXTConnection

Corporate Accounts Welcome

Yes, we gladly accept P.O.s. Always have, always will. In fact, we do everything possible to make corporate mail-order purchasing of computer software and peripherals as easy and enjoyable a process as possible—within the realm of common decency, of course. Many companies (including most of the Fortune 1000 and other just-as-fortunate smaller ones) have accounts with us. If you'd like to open one (or check whether your company already has one), simply call our order line at 800/800-NeXT.

PRODUCT INDEX

PUBLISHING & GRAPHICS

Item# Manufacturer Price

Adobe
(See page D)
1827 Adobe Illustrator 3.0 $459.
9765 Plus Pack 1.0 199.
9741 TouchType 1.0 175.
1832 Adobe TypeSet 1 65.
1833 Adobe TypeSet 2 65.
1834 Adobe TypeSet 3 129.

Lighthouse Design, Ltd.
(See page L)
8621 Diagram! 1.0 339.
8660 Diagram! 1.0 *(optical media)* 469.

Media Logic
(See page G)
9987 TopDraw 1.0C 479.

Micro Maps
(See page I)
9276 MapArt 1.0 95.

Stone Design
8658 TextArt 1.0 319.
8666 TextArt 1.0 *(optical media)* 549.

T/Maker
1185 ClickArt 1.0 195.

RECREATIONAL

Athena Design
9457 Culture Shock 1.0 22.

GENERAL BUSINESS & PRODUCTIVITY

DIT ... 1 year warranty
(See page C)
8657 On Duty 1.0 209.

Imagine, Inc.
(See page E)
1396 MediaStation 1.53 829.
1397 MediaStation 1.53 *(5 pack)* 3129.
1398 MediaStation 1.53 *(20 pack)* . . . 9379.
1400 MediaStation Educ. Package . . . 295.
1394 MediaStation Educ./Ntwk. Pkg.. 2795.

Insignia Solutions
(See page J)
1456 SoftPC 2.0 329.

Lotus Development
(See page K)
9794 Improv 1.0 $549.

WordPerfect
(See page F)
8818 WordPerfect 1.0.1 329.
8859 WordPerfect *(5 user)* 1289.
8928 WordPerfect *(20 user)* 3799.

PROGRAMMING TOOLS

Absoft
8898 Fortran 77 3.0 839.

Objective Technologies
(See page H)
9347 [OT Palettes: 2.0] Chooser. 429.
9344 [OT Palettes: 2.0] Graph 1259.
9346 [OT Palettes: 2.0] Math 650.
9345 [OT Palettes: 2.0] SmartField 650.

Professional Software
(See page I)
9357 Objective DB Toolkit 2.0 895.

AUDIO & VISUAL PRODUCTS

Metaresearch ... 1 year warranty
9682 Digital Ears 519.
9683 Digital Ears *(with Soundworks)* . . 695.
9681 Digital Eye. 849.
9680 Soundworks 269.

COMMUNICATIONS & DATA TRANSFER

Marble Associates, Inc.
(See page F)
1012 Teleconnect 249.

Abaton ... 1 year warranty
8665 InterFax 24/96 *(fax/modem)* 489.
8620 300/GS Scanner
(requires Interface Kit) 999.
9449 Interface Kit *(for 300/GS)* 479.

Dove Computer ... 1 year warranty
(See page H)
9356 DoveFax Desktop for NeXT
(includes 2400 modem) 395.

Hayes ... 2 year warranty
2307 Smartmodem 2400
(requires cable) 349.
6655 V-Series 2400 Modem
(requires cable) 449.
5991 V-Series 9600 Modem
(requires cable) $539.
7391 Ultra 9600 Modem
(requires cable) 669.

Intel ... 5 year warranty
5119 2400EX Modem *(requires cable)* . 179.
7880 9600EX Modem *(requires cable)* . 549.
6420 2400EX MNP Modem
(requires cable) 229.

Telebit ... 1 year warranty
8907 T2500 Modem *(requires cable)* . . 979.

CONNECTIVITY

Data Viz
1823 MacLinkPlus/PC 5.0 129.

DIT ... 1 year warranty
(See page C)
8656 FloppyWorks. 185.

UTILITIES

Agog, Inc.
(See page F)
1476 Squash! 1.0 79.
1478 Squash! 1.0 *(10 pack)* 699.
1479 Squash! Educational Pack 1.0. . . . 49.
1481 Squash! Educational Pack 1.0
(10 pack). 429.

DIT ... 1 year warranty
(See page C)
8661 FloppyWorks
(with CubeFloppy 2.9). 579.

DRIVES & CABLES

Cables ... lifetime
8906 SCSI 2-50 Pin Centronics *(4 ft.)* . . . 45.
8992 68030 Modem Cable *(8 ft.)* 15.
8991 68040 Modem Cable *(8 ft.)* 15.
8908 SCSI 1-50 Pin Centronics 12.
8909 50 Pin-50 Pin Centronics. 15.
1106 SCSI Terminator 29.

Micropolis ... 2 year warranty
8984 280 MB Ext. Hard Drive *(15 ms)*. 1629.
8979 280 MB Int. Hard Drive *(15 ms)* . 1429.
8978 550 MB Int. Hard Drive *(16 ms)* . 2099.
8919 860 MB Int. Hard Drive *(15 ms)* . 2949.

Peripheral Land, Inc. ... 1 yr. wrnty.
(See page I)
8887 Caddy for CD-ROM Drives 19.

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7105 Back-UPS 600 469.
7110 Back-UPS 800 599.
7109 Back-UPS 1200 799.

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4812 ½" x 1¾" Laser Labels *(Qty. 2000)* 7.
4807 1" x 2⅝" Laser Labels *(Qty. 3000)* 24.
4809 2" x 4" Laser Labels *(Qty. 1000)* . $24.
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5392 3½" Disk Labels *(Qty. 630)* 29.
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4810 8½" x 11" Laser Labels *(Qty. 100)*. 24.
4811 8½" x 11" Laser Transparencies *(Qty. 50)* 22.

Canon ... 90 day warranty
(See page H)
9811 512 MB Optical Cart. *(MO-502m)*. 175.

Curtis Manufacturing ... lifetime
1707 Ruby *(SPF-2)*. 55.
1708 Ruby Plus *(SPF-2+)*. 65.
5832 Ruby Remote *(SPFR-2)* 65.
5985 Safe Fax *(SF-1) (1 year warranty)* . . 19.
9757 Top Shelf *(TS-1)* 18.
1713 Filtered Safe Strip *(SPF-3) (1 year warranty)* 24.
1718 3½" Disk File *(DB-2) (holds 40)*. . . . 8.

Hewlett-Packard ... 120 day wrnty.
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5228 PowerBacker 1200 *(2 yr. warranty)* 829.

Maxell ... 60 day MBG
2793 DS/HD 3½" 1.44 MB Diskette *(Qty. 10)*. 21.

Memory ... 2 year warranty
(See page H)
8911 16 Meg Memory Upgrade Kit . . . 895.
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SyQuest
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9728 Syquest Cartridge *(45 MB) (10 pack)*. 699.

Toshiba ... lifetime warranty
(See page H)
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9755 Toshiba 3½" ED Diskettes *(Qty. 10)* 79.

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9802 DS/ED Disks 3½" 2.88 MB *(Qty. 10)* 89.

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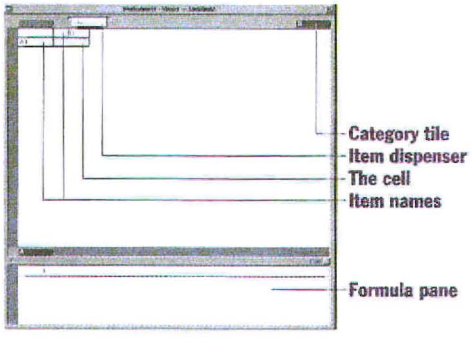
Building a Budget in Improv

by DARCY DINUCCI

When Lotus built Improv, the development team re-thought the spreadsheet interface from the ground up. In the process, they took away some of the signposts people have come to take for granted when they work with speadsheet programs. Opening an Improv worksheet for the first time can be daunting. This tutorial will get you started with the program and familiarize you with the simple rules of the new interface.

Starting a new model in Improv brings up the simplest form of spreadsheet life, a one-celled spreadsheet (Figure 1). The item names (currently labeled A1 and B1) are linked to the categories (now named A and B) identified by the tiles on the corners of the worksheet. You'll see how in a few minutes.

Figure 1. **Opening Improv yields a one-cell spreadsheet.**



Building the structure

Click the A category tile, type "Line Item," and press Return. Your y-axis category is now named "Line Item," and the item names are changed to reflect the new identifier. Select the B category in the same way, type "Quarter," and press Return.

Improv worksheets contain only the cells that you need. You add cells by adding new items, using the Item Dispenser (Figure 2). Pull down four items with the Item Dispenser (by dragging the item label down), and tear them off (by dragging to the side). Drop them on Line Item1. Drag off four more items and drop them on Quarter1.

Click on Line Item1 and type "Revenue." In the same way, rename the other line items Salaries, Rent, Taxes, and Profit. Rename item Quarter5 as Total. Notice that the other items in this category are already named appropriately.

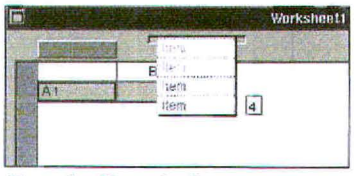
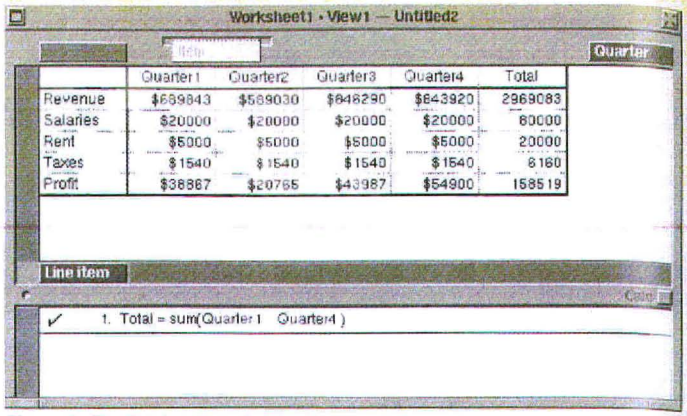


Figure 2. **Dispensing items**

Click in the Revenue cell in Quarter1, and enter the data shown in the Quarter columns in Figure 3 (type the numbers only, without dollar signs). Do likewise for the rest of the Units cells. You're doing something you can't do in traditional spreadsheets: typing directly into cells. In traditional sheets, both data and formulas belong to cells, so you must type into a kind of holding pen while the program waits to see whether you're entering data or a formula.

All the items in this spreadsheet should be formatted as currency. Select the line item names and click on the dollar sign ($) in the Format panel. Choose the number of decimal places by clicking on the number of decimals you want (in this case, none).



	Quarter1	Quarter2	Quarter3	Quarter4	Total
Revenue	$689843	$589030	$646290	$643920	2969083
Salaries	$20000	$20000	$20000	$20000	80000
Rent	$5000	$5000	$5000	$5000	20000
Taxes	$1540	$1540	$1540	$1540	8160
Profit	$38867	$20765	$43987	$54900	158519

Figure 3. **The Totals column is filled by formula 1.**

Writing formulas

Now write a formula that sums the Quarter columns. Improv formats use a syntax like the one you're familiar with from traditional spreadsheets, with one difference: it uses plain English to name data, instead of naming the cells. You write the formula with Improv's many formula-writing tools in the Formula Pane, the lower section of an Improv worksheet window.

Double-click on the line labeled "1" in the Formula Pane to enter formula-writing mode (the pointer changes to white with a black border, and a formula bar appears above the pane). To sum the Quarter columns, click the Total item name in the worksheet. Then click = (on the formula bar), click Functions, select "sum(list)" in the Functions panel, and click Enter. Specify the list you want to sum by double-clicking the word "list" in the formula, dragging across the Quarter1 through Quarter4 item names, and pressing Return.

Notice that when you finish the formula, sums pop up in all of the Total cells. This effect points out an important difference in the way Improv treats formulas: instead of expressing cell geography, Improv formulas express the relationships of categories of data. In a traditional spreadsheet, you'd need a formula in each Total cell. Improv recognizes data by its name, anywhere it exists in the worksheet.

In managing the actual budget, you'll want to track the actual costs for each item and calculate the variance between the actual and planned numbers. You can do this in Improv by adding a second-level category.

To add a new category, first select the category name that you want to multiply (in this case, Quarter), by clicking it. Then choose Add Category in Improv's Edit menu. Another category tile, called A, appears above the Quarter tile, and the category name A1 appears above the Quarter titles. Click on the category tile and type the category name, Tracking.

Add two items to the new category. Rename the tracking items Plan, Actual, and Variance. Since you have forecast well and your actuals were exactly on plan, copy the numbers from the first category, Plan, into the Actual cells by selecting them and copying and pasting them into the new area. Select only the cells that contain numbers (not the Total cells, which are calculated by formulas).

Now create a formula for Variance. Select Formula 1 and press Enter (not Return), or select it and choose Add Formula from the Edit menu. (Notice that this is the same menu command you used to add a new category before. The command changes according to what kind of item you

[CONTINUED ON PAGE 70]

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Hints and Tips

by CHUCK FARNHAM

Adobe Illustrator 3.0

Filename extensions You can make an Illustrator file available for placement as an EPS (Encapsulated PostScript) file in other applications by simply changing its extention from .ai to .eps. (EPS is the native format of Illustrator files.)

Instant selection tool You can access the selection tool while using another tool by holding down the Command key and deselecting the previously drawn object–particularly useful when you're setting multiple text blocks or objects. When you release the Command key, the cursor changes back to the Text tool insertion point.

Compound text objects Illustrator often draws a path in a direction you don't expect (the program controls the direction), which can cause problems when you're creating compound objects. You can reverse the direction of an individual object in a compound object by selecting the individual object with the Direct Select tool (the hollow arrow), then clicking the Reverse button in the Paint Style panel. If several objects in a compound are drawn in the wrong direction, try changing the backmost objects. (Note: If the Reverse button is dimmed, you have more than one object selected, and those objects have different direction attributes.)

Custom style palettes Preserve your favorite fonts, custom colors, patterns, and custom graph designs by creating a special template file. Save a file containing all the special features as Adobe_Illustrator_Startup.ai, and place it in your Adobe Illustrator directory. Then all new documents you create with the application will have those attributes available in their appropriate style panels. (Be careful, however: If you save too much information, the Illustrator application could slow down considerably.)

File information You can use Adobe Separator's File Info command (in the Panels menu) to reveal information about the contents of an Adobe Illustrator file, or any EPS file. File Info includes information about the file's creator, PS and EPSF versions, bounding box size, and fonts and patterns. Choose between General, Fonts, Patterns, and Files to display the information you need.

WordPerfect 1.0.1

Updating font lists Because of a peculiarity in the NeXT operating system, the .fontlist file in the LocalLibrary/Fonts directory may not be updated when you install new fonts, so the new fonts will not be visible when you open the Font panel. (This irregularity occurs only in the LocalLibrary/Fonts directory, not in any user-Library directories.)

You can update the .fontlist file yourself by using the Terminal application. Make sure you have write-access privileges to the LocalLibrary/Fonts directory, then open the Terminal application and type `buildafmdir/LocalLibrary/Fonts` inside the Terminal window.

TopDraw 1.0

Text in objects You can make text wrap to the boundaries of an irregularly shaped object by typing, pasting, or importing text into the object itself. To type the text, just double-click on the desired object and start typing. Paste text that was previously copied or cut from within TopDraw or another application by double-clicking on the object to set an insertion point, then using the Paste command. To import ASCII or RTF (Rich Text Format) text, use the Import option in the Window menu after double-clicking.

Printing workaround Documents that contain single span lines with arrowheads sometimes have trouble printing (it's a known bug). You can get the same effect using the Polyline tool, normally used for more complex outlined objects.

Perfect shapes The quickest way to create perfect squares and circles is to hold the Shift key while dragging out the rectangle or ellipse at a 45-degree angle. Holding the Shift key while dragging the mouse constrains the object so that it is drawn in specific angle increments. (Note: You can specify the value of those increments in the Preferences panel; default is 45 degrees.)

Aligning overlapping patterns TopDraw aligns patterns by starting from the lower left corner of the page rather than aligning them with the boundaries of the individual objects. This ensures that pattern fills within two overlapping objects will always align.

TextArt 1.0

Selecting images If you hold down the Alternate key while selecting a graphic in the Image Display window, the graphic is copied to the layout board. This will give you more control over the object, allowing you to get a tighter bounding box on it, add other graphics and text to it, or otherwise modify it. (If you select the graphic without pressing Alternate, the graphic is copied to the Pasteboard.)

Slider controls Alternate-Shift drag on a slider or circular slider to get fractional values, to obtain, for example, rotations like 12.93 degrees and incremental type point sizes like 12.5. Command-Click a slider to reset it to its default value. You can get values lower or higher than those accessible with the slider by typing the value into the slider's text field.

Cleaning up Command-O resets all special effects and hides the special effects windows–good for quick cleanup after you've stumbled into a particularly gruesome effect.

Thanks to the technical support staffs of the above applications for their help in compiling these tips and hints. For all their effort, these unsung heroes of the computer industry rarely receive credit from a public that is quick to call an 800 number only to find out that the problem they called about is covered on page 2 of the manual. To contribute to this column for future issues, send tips to cfarnham@nextworld.com.

CHUCK FARNHAM *is a hardware-support engineer and consultant specializing in teaching computer skills to individuals with developmental disabilities.*

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[CONTINUED FROM PAGE 68]

have selected.) Build the formula by clicking Variance (in the worksheet), then = (in the formula bar), then Plan (in the worksheet), then ± (in the formula bar), then Actual (in the worksheet). Then press Return.

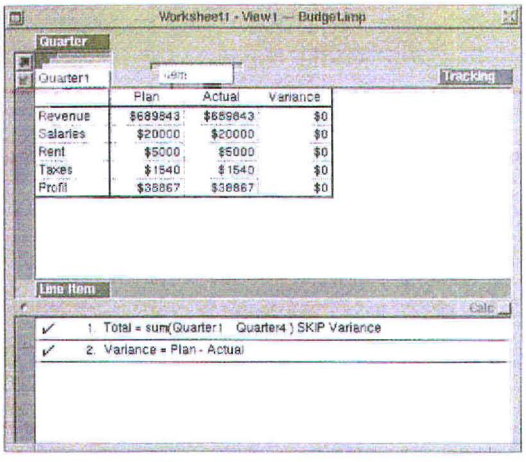


Figure 4. **By dragging a category tile to the third axis, you create a three-dimensional model.**

At the left of both formulas, you will now notice a new symbol, the overlap symbol. This appears because the two formulas are trying to calculate the Total Variance (Formula 1 by adding Quarter1 through 4 in Variance; Formula 2 by subtracting Actual's Total from Plan's Total). In traditional spreadsheets, the last formula in a cell takes precedence, but Improv tells you explicitly what's happening and gives you control over the resolution.

Click the overlap symbol for Formula 2. In the Overlap panel, click OK (use of Formula 2 is preselected). A skip clause reading "SKIP Variance: Total" is added to Formula 1.

Different views

Now your boss says, "Great, but what I'd really like to see is Plan, Actual, and Variance by quarter." On a traditional worksheet, you'd be out of luck, because once formulas are in place it's impossible to fundamentally rearrange your view of the sheet without breaking the formulas. Because Improv formulas are attached to data names and not to cell geography, the sheet can be rearranged at will. You can have up to four categories on each of the three axes and rearrange them to your heart's content.

To appease your boss, drag the Tracking tile to below Quarter at the top right corner of the worksheet. The sheet is automatically rearranged, and all the formulas still work. You can create as many views as you have categories. To view the line items by Quarter, drag the Quarter tile into position in front of the Line Item tile.

To view the data one item at a time, drag the Quarter tile into position over the unused tile in the top left corner of the window (Figure 4). You can scroll through the quarters by clicking the arrows to the left of the tile.

Improv features you haven't seen here allow you to group items to create subcategories and subtotals, then collapse the groups as you would collapse and expand groups in an outliner, to get summarized views of the data. Another feature lets you save different views of a set of data, then open them from a model browser window.

Improv's extensive documentation and on-line help will guide you through those and other additional features. What you've seen here should give you an idea of the uses of named data, and what to do when you see a one-cell spreadsheet.

DARCY DINUCCI *is the managing editor of* NeXTWORLD.

NeXT Question

Q: WriteNow's date stamps–both the fixed and updating markers–put zeros in front of single-digit dates. For example, February 2 displays "Feb 02, 1990." Under 1.0, it displayed "Feb 2, 1990," a much more elegant rendering. Is there any way to remove the leading zero under 2.0?

J.D. Levine
Shaker Heights, OH

A: *WriteNow currently makes sure that the length of the date entry is always the same by appending a leading zero when the day of the month is only one digit. If you prefer the date to be one digit, you can chose the Fixed Text option, then edit it to remove the leading zero. With updating markers, you're stuck with the leading zero.*

–Andreas Sautter, NeXT Technical Support

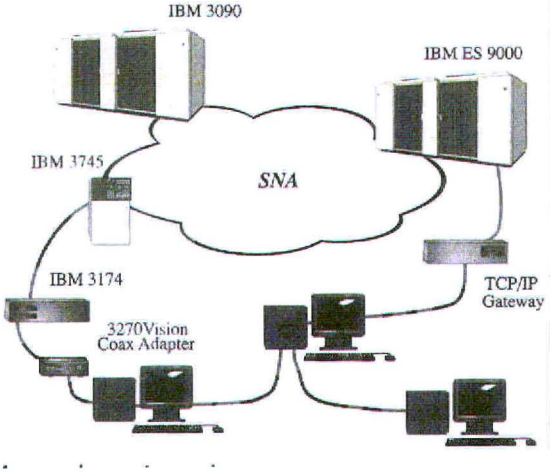
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Linking Into the Internet

by Daniel Miles Kehoe & Seth T. Ross

Any NeXT computer–in fact, any UNIX computer–will let you and your organization plug into the planet. Though it seems like futuristic fiction to those who've never participated, many NeXT users routinely connect to a global computer network. The net result is very practical: essential resources for your company.

With a planetary link in place, your company is no longer limited to e-mail within a local area network. You can exchange electronic mail with anyone who's plugged into the worldwide network, including many other NeXT users. You may arrange to receive a Usenet news feed, including access to the comp.sys.next bulletin board, which delivers as many as a hundred postings a day of NeXT-related tips, tricks, rumors, queries, and idle chatter. Or you may wish to receive a news feed from ClariNet, which delivers newspaper wire services in electronic form. Finally, the link gives you the ability to access public archive servers containing libraries of freeware, shareware, and accumulated NeXT wisdom.

The keys to the planet start with UUCP (UNIX to UNIX Copy), UNIX utilities that automate telecommunication between computers. UUCP utilities are included with every NeXT computer. This article will show you how to set up a UUCP link to the Internet, the backbone of the planetary network.

The view from space

An internet (in lowercase letters) is a simple combination of two or more local area networks. But there's only one "capital-I" Internet: a vast agglomerate of regional networks established by universities and research institutions, increasingly used by commercial organizations (see "Quick and to the Point," *NeXTWORLD* April 1991). A UUCP connection isn't actually "on the net," but with a UUCP link you can reach any Internet site (and other UUCP users) through a hub service, a service provider that transfers mail and news from the Internet backbone.

In North America, both UUNET Technologies and Performance Systems International (PSI) provide nationwide hub services to commercial organizations. Local hub services also offer access to the commercial Internet backbone. An individual or a company can establish a link with UUNET, PSI, a local hub service–or a friend with a link (the research community has built a nest of informal UUCP links). Costs generally run about $25 to $35 per month; some services also charge hourly connect charges. If you work for a university or research organization, you may use the CREN CSNET service. Table 1 shows your choices for hub services in large American cities.

Keys to the planet

All computers that use the UNIX operating system come equipped with the utilities needed for unattended computer-to-computer communication. By configuring several system files and linking together two computers via modem, you can transfer files, run applications remotely, and exchange electronic mail.

UUCP is not a single application. A background program, or daemon, is responsible for UUCP's unattended file transfers and remote execution requests. The daemon can do nothing without its companion system files. The most important system file is /etc/uucp/L.sys, which contains the list of your machine's planetwide connections and instructions on how to reach them. A second important system file is /etc/uucp/L-devices, which establishes a correspondence between device names in L.sys and the particular configuration of modem, baud rate, and port that is used for a dial-out link.

Sendmail (the UNIX mail-transfer agent that underlies NeXTmail) and tip (the UNIX utility for dial out and remote login) are not part of the UUCP suite; however, sendmail must be configured when UUCP connections are established, and tip is useful in the initial configuration of a modem.

Setting up a UUCP link

You can try to set up a UUCP link with a generic Hayes-compatible modem and a Mac-to-modem serial cable, but that path can be risky. It's better to purchase a NeXT-specific serial cable. If you expect to receive a lot of mail or news you'll want to invest in a fast modem.

The steps of a UUCP installation are shown in the sidebar "A UUCP Installation Plan." Before you get started, you may want to consult Chapter 14 of the *NeXT Network and System Administration* manual, which is particularly helpful.

If you encounter difficulties, they will likely be caused by problems with permissions (the owner and group assigned to a file) or errors in the

TABLE 1: UUCP HUB SERVICES

CITY	ORGANIZATION
CALIFORNIA	
Cupertino	Portal Communications
Los Angeles	PSI
Menlo Park	Anterior Technology
Mountain View	PSI
Santa Clara	PSI
COLORADO	
Colorado Springs	Colorado SuperNet
Denver	Colorado SuperNet
Denver	PSI
Fort Collins	Colorado SuperNet
CONNECTICUT	
Hartford	PSI
GEORGIA	
Atlanta	PSI
ILLINOIS	
Chicago	/usr/group/chicago
Chicago	PSI
MASSACHUSETTS	
Boston	PSI
MICHIGAN	
Detroit	PSI
NEW JERSEY	
Newark	PSI
Trenton	PSI
NEW YORK	
Albany	PSI
Buffalo	PSI
Islip	PSI
New York	PSI
Rochester	PSI
Syracuse	PSI
White Plains	PSI
OREGON	
Portland	PSI
PENNSYLVANIA	
Philadelphia	PSI
Pittsburgh	PSI
TEXAS	
Dallas	PSI
Houston	PSI
VIRGINIA	
Falls Church	UUNET
Reston	PSI
OTHER U.S. CITIES	
Various	UUNET

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L.sys and L-devices files. Help is readily available. Possible sources are the technical support staff at a hub service or a neighboring site's system administrator.

You are using a NeXT computer, so it's reasonable to ask if you can set up a UUCP link without employing the UNIX black arts. You can. RightBrain Software is developing a point-and-click application called UUCP Manager. And Neuron's Fax96+ modem ($1095) comes bundled with UUCP-installation software. Before you take the shortcuts, though, make sure you understand the issues. A company's UUCP link is critical, and a dedicated system administrator will want to understand UUCP's hidden machinery. Read on.

A UUCP Installation Plan

Steps	Time
1. Connect your NeXT to a modem; test dial-out	1–5 hrs.
2. Sign up with a hub service or find a friendly UUCP neighbor	1–2 hrs.
3. Add your hub service to the L.sys file	15 min.
4. Edit the L-devices file to describe your modem	15 min.
5. Configure the sendmail.cf file	1–2 hrs.
6. Test the mail link	5 min.

Name and address, please

Every mail server on the Internet has a registered name and mailing address. Computers linked via UUCP should be registered, too.

If just one computer will be the mail host in your organization, use the name of your company or a recognizable abbreviation of your company's name. The name must be unique if you want mail to find your users. Your hub service will check Internet and UUCP maps to see if the name is already in use (ask an expert for help if you're not working with a hub service). You may want to reconfigure your NetInfo server with the mail server name as the host name if the host is not already appropriately named.

You must register your company's mail host name within an Internet domain, which functions as an address for mail routing. Six domains are defined by tradition: .com, .edu, .gov, .mil, .net, and .org (company, education, government, military, network hub, and nonprofit organization, respectively). If your company has geographically dispersed offices, you may wish to register in the .com domain. Alternatively, you can use a country domain, which provides a geographical heirarchy of organization and location. Many smaller American companies, and individuals, register in the .us domain. Commercial hub services will register your mail host name and domain for you. If you are setting up your own link, contact the .com domain name registrar at the Network Information Center at SRI International or the .us domain name registrar at the Information Sciences Institute.

Configuring files

Now, down to editing the system files.

You must log in as root before you start. Start up the Edit application and open /etc/uucp/L.sys, your first target. Ask your hub service for the information you need to customize the file. Edit the file to look something like this:

```
#L-sys: Please read UUAIDS/L-sys.samples for some
#discussions on how to use this file as well as the
#documentation that can be found in the Digital Librarian on
#uucp.
#
uunet Any DIR 19200 cua\
  ""\r\r\
  ""AT\
  ""AT&FQ0E1V1\
  OK ATS7=60S61=0S50=255S52=2S58=0S110=1S111=30S131=1\
  OK\dATDTw,9,18008776550\
  FAST~75\r\
ogin:~10-\r-ogin:~20 Unextwrld\
sword: 0
```

In this example, the authors set up a UUCP link using a Telebit T2500 modem to the host "uunet" at UUNET Technologies. Substitute your hub service's hostname for "uunet" (in the first line), and the hub service's phone number for "18008776550" (UUNET's data number, in the sixth line). In addition, you'll indicate your modem's speed ("19200" in our example) and port ("cua," corresponding to serial port A, in the first line). The fifth line sets the modem's registers, configuring the Telebit's speed and data-exchange protocols. If you're using an ordinary Hayes-compatible modem, a simple ATd18008776550 dialing sequence will suffice. Your hub service will provide a login sequence for the last two lines, which will include your login name at the hub service ("Unextwrld" in our example) and a password ("0" here).

A word to the wise: Avoid frustration later by making sure there is a comment character (#) at the beginning of blank lines or lines you have not added yourself. Blank lines in your L.sys file can mysteriously sabotage UUCP links.

Left to your own devices

Next you must edit the file /etc/uucp/L-devices. This file provides specific information to UUCP about the modem's device port and its capabilities. The DIR flag in the first line of the L.sys file must have a corresponding line in the L-devices file. If you're using a fast modem, use the following line:

```
DIR cua unused 19200 direct
```

If you're using serial port B, substitute "cub" for "cua." If your modem does not run at 19,200 baud, substitute the correct baud rate. You may wish to comment out all other lines in the file by entering a # character at the beginning of each line.

If you have a 68040-based NeXT computer, you'll want to take advantage of the faster throughput offered by hardware flow control. You'll replace references to the cua or cub serial port drivers with "cufa" or "cufb." But first you must be sure you are using a modem that supports hardware flow control (not all do), and you must be certain that the L.sys file contains a sequence that sets the modem's registers to enable use of hardware flow control. Sophisticated users can eliminate the complex modem-setup string in the L.sys file by calling a stored profile in the modem; if you're just starting, don't bother.

Permissions, please

Before you test your UUCP connection, you'll need to deal with UNIX file permissions. You edited L.sys and L-devices as root, a member of the wheel group. But the files must belong to a user named "uucp," of the daemon group. Every time the L.sys and L-devices files are edited and saved, you must chown the owner and group. It's easy to do. Launch a Terminal window and enter the commands

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```
cd /etc/uucp
ls -lg
chown uucp.daemon L.sys
chown uucp.daemon L-devices
ls -lg
```

The first command moves you to the /etc/uucp directory. The second command shows a list of the files with their owners and groups (you'll see root and wheel associated with the two files you edited). The chown commands change the owner and group. And the final "ls -lg" shows the changes you made. Avoid trouble later by verifying that the L.sys and L-devices permissions are -rw——— or -r——— (that is, modifiable only by the owner).

A trial run

To dial out using your modem, you'll have to match modem, cable, and the /etc/remote file to enable simple communication. Use the UNIX tip utility to check your connection to your hub service. Run tip from a Terminal window using the following command:

```
tip -19200 18008776550
```

replacing "-19200" with the speed of your modem, and replacing UUNET's phone number ("18008776550") with the phone number of your hub service. If you encounter error messages, refer to the manual pages for tip (type "man tip" in the Terminal window) and check the entries in your /etc/remote file.

If tip runs successfully, test your UUCP link. Exit tip by typing ~. Then, in the Terminal window, enter

```
cd /usr/lib/uucp
ls
uucico -r1 -x5 -suunet
```

(substitute your hub service host name for the string "uunet" above). The first command moves you to the directory where uucico hides, and the second command lists the contents of the directory so you'll know you're in the right place. Enter the uucico command, and UUCP status messages will roll up your Terminal window–with any luck, showing a successful connection. If the connection cannot be established, the status messages will serve as guideposts to your hub service's technical support staff in troubleshooting.

Keep your fingers crossed when first testing the UUCP link. If something goes wrong, it will be time-consuming to identify and correct, because there are many variables to isolate. In troubleshooting, first check the entries and permissions in the L.sys and L-devices files. Recognize that if you cannot manually dial out with tip, UUCP will not work automatically. Complex problems may require reference to the *NeXT Network and System Administration* manual, man pages, and sample L.sys and L-devices files found in the directory /etc/uucp/UUAIDS.

The black magic

With a working UUCP link, just one roadblock stands in the way of you communicating with the world: sendmail. Don't even try to understand the format of the sendmail.cf file; it's not worth the trouble. Start up Edit and open the file /etc/sendmail/sendmail.cf. Near the top of the file (around line 30), you'll see the line

```
DMuucp
```

which tells sendmail that mail destined for a machine off the local network

Hints and Tips

Standard network time

On a small local area network, one server will likely be used to maintain the correct time and date (servers connected to the Internet typically use an ntp service). This master time server synchronizes the time on the client computers. After time changes and power outages, however, you can't set the time using the clock panel in the Preferences application, either on the master server or on the client machines. Instead, you'll need to use the date command in a Terminal window on the master time server. The form of the command is

```
date yymmddhhmm[.ss]
```

For example, to change the time and date to 5 a.m. September 1, 1991, you would issue the command

```
date 9109010500
```

Changing logins

If you are logged in to a Terminal window as root and need to do something as a normal user to avoid creating mayhem, use the suspend command. This will effectively log the session in under the original user's name. To continue as root, type "fg."

Easy backup

Back up hard disks conscientiously! The best method is the dump utility, which offers an incremental backup approach, copying only files that have been modified since the last backup.

The dump utility has nine levels of backup. Level 0 copies the entire file system, and each subsequent dump level copies those files that have been modified since the most recent dump with a level number lower than the current dump. (For example, a level 6 dump copies all files changed since the most recent dump with a level of 5 or greater.)

Two caveats. Run dump as a member of the operator group but not as root. This will protect against wiping the disk through a typing error or other mishap. Also, be sure to run a fsck before doing a level 0 dump. This will check the hard drive for file system corruption.

The following dump command backs up an entire file system (level 0), where "/dev/rsd0a" is the file system:

```
dump 0u /dev/rsd0a
```

The u option causes dump to record the date, time, and level at which the file system was backed up, in the file /etc/dumpdates.

The optical disks in use with the original NeXTcube (and now supported as a drive option) make excellent backup devices. Dump will also work with the extended-density (ED) 2.88MB floppy disks supported by all of NeXT's new computers.

To perform a level 9 dump to an internal floppy disk, use a command of the following form:

```
dump 90f 2.6 /dev/rfd0a
```

where "0" specifies floppy disk, "2.6" specifies the capacity (formatted) of the disk, and "/dev/rfd0a" specifies the floppy drive device.

You can specify a dump to the standard output by using a file name of– (hyphen); try compressing the dump file so it takes up less space. For example,

```
dump 9uf - /dev/rsd0a | compress > /Dumps/sd0a-9.dump.Z
```

does a level 9 dump on /dev/rsd0b and sends the output to compress, which in turn writes to a folder on the Dumps optical disk. Note that the name of the resulting file has the .Z suffix, which indicates that the file is compressed. Use the uncompress command to recover the original, full-size file.

Please send any tips you'd like to share to kehoross@nextworld.com.

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should be forwarded using the UNIX UUCP facility as a mailer. You must specify the name of the host at your hub service by finding the lines

```
DR mail-relay
CR mail-relay
```

and changing "mail-relay" to the hub service host name (in our sample sendmail.cf file, "uunet").

The default sendmail.cf file supplied with your NeXT is intended for mail hosts that are actually on the Internet (Internet machines use a beast called the ddn mailer rather than UUCP). Since your link to the planet uses UUCP, you must make further modifications to your sendmail.cf file. Deep down in the file, around line 323, you'll find the following seven lines:

```
# If you want to pass all other explicit domain names up the ladder
# to our forwarder then uncomment the following line.
#R$*<@$*.$+>$*                  $#$M  $@$R
$:$1<@$2.$3>$4                  user@any.domain
# and comment out this one.
R$*<@$+.$->$*                   $#ddn $@ $2.$3
$:$1<@$2.$3>$4                  user@any.domain
```

that describe how to forward nonlocal mail. The instructions are explicit: remove the "#" from line three and add "#" to the beginning of line six.

Then remove the "U" from the following line:

```
Muucp,                          P=/usr/bin/uux, F=ms
DFMhuU, S=13, R=23, A=uux - -r $h!rmail ($u)
```

With U in place, you can send mail, but you may get an erroneous warning that the mail was never delivered.

None of this may be necessary if your hub service supplies you with a preconfigured sendmail.cf file. If your hub service routinely supports NeXT users, the service will have the proper file on hand and will be able to load it on your computer as soon as the UUCP link is in place.

Plugging into the planet

With a UUCP link that is known to work, and the required changes to the sendmail.cf file, you'll simply enter

```
uupoll -n uunet
```

in the Terminal window whenever you wish to check the hub service for mail (substitute the name of your hub service host for "uunet"). The modem's lights will blink, and mail messages will appear when New Mail is selected in the Utilities menu of the NeXTmail application. Select Deliver after you have composed a message, and the message will be spooled for delivery at the next polling of your hub service. You're plugged into the planet!

The authors invite you to send a short text message when you've succeeded in establishing your UUCP link (our address is below). We'd love to see that you've joined us.

DANIEL MILES KEHOE AND SETH T. ROSS *are contributing editors for* NeXTWORLD. *They can be reached at dkehoe@nextworld.com or sross@nextworld.com.* *Thanks to Dick Benster, Geoff Goodfellow, Alan Marcum, Jiro Nakamura, Robert Nielsen, Glenn Reid, Roger Rosner, and Michael Rutman for their assistance with this article.*

NeXT Question

Q: Consider the following hookup: My NeXT computer is linked by telephone to a non-NeXT computer which is connected to the Internet. How can I send and receive NeXTmail (voice, EPS, and so on) with other NeXT computers linked to the Internet?

John Van Heteren
San Francisco, CA

A: *If you are already receiving ASCII mail, there is nothing that needs to be done separately to enable you to receive NeXTmail with voice or other attachments. It just works. NeXTmail will encode the format of the message so that it can be sent through standard mail facilities such as those used on the Internet. On the receiving end, NeXTmail decodes the message as needed. To send mail to users on non-NeXT machines, use the Non-NeXT option in NeXTmail's Send window.*

— Andreas Sautter, NeXT Technical Support

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609/243-7538; e-mail: dan@neuron.portal.com

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408/973-9111; e-mail: jel@corp.portal.com

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408/734-4333; e-mail: netblazer@telebit.com

U.S. Domain Registrar
Information Sciences Institute, 4676 Admiralty Way #1001, Marina Del Ray, CA 90292
213/822-1511; e-mail: westine@isi.edu

UUCP Manager
RightBrain Software, 132 Hamilton Ave., Palo Alto, CA 94301
415/326-2974, 800/472-7246; e-mail: info@heaven.woodside.ca.us

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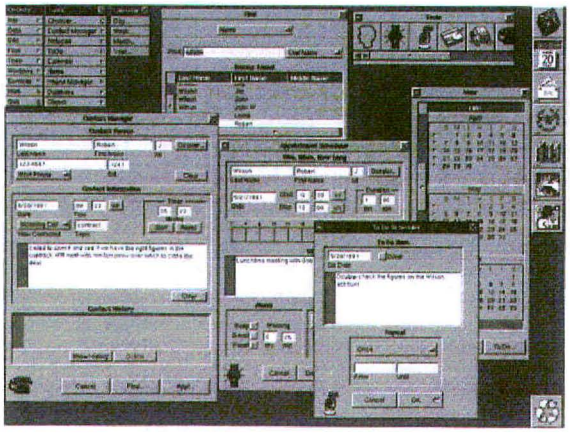


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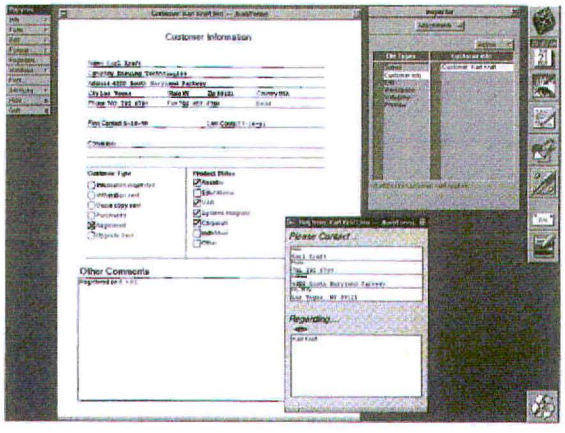


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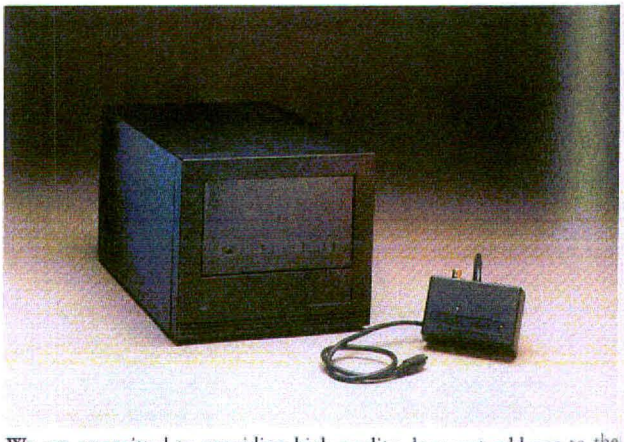


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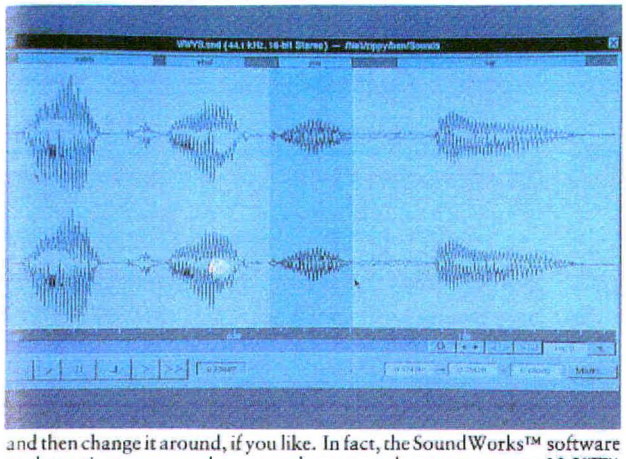
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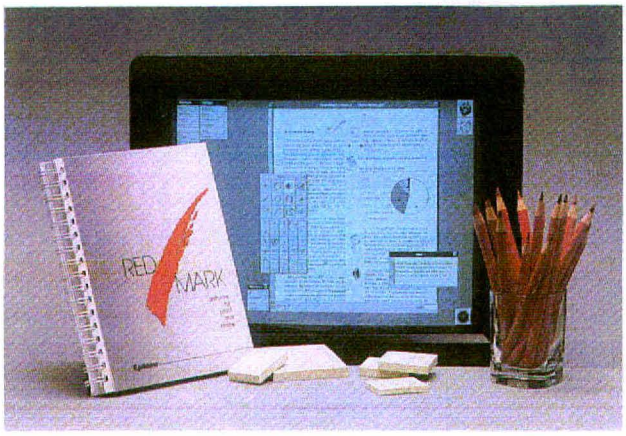
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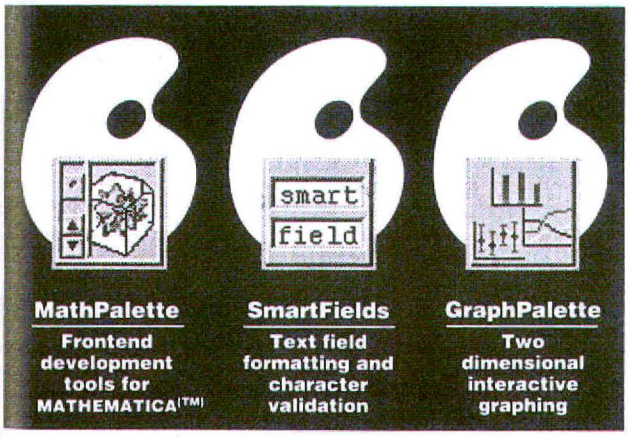


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program. There seemed to be no way to automatically resolve them. When Improv detected a conflict, it invalidated both formulas and complained to the user. Yes, sometimes formulas were not very nice.

"Jobs said, 'This is not a weakness, it is a great feature!' " remembers Kleppner. "With 1-2-3, you can copy and blow away a formula." The fact that Improv could automatically detect conflicts and tell the user about them was a major step forward.

As the product matured, many commands held over from the OS/2 version were eliminated. Meanwhile, the Help system and the Presentation Builder were developed as separate application programs (the Help system was later integrated into Improv). Forty people, including 13 developers, were working on the project. All of the pieces were falling into place.

Back in Redwood City, California, NeXT was struggling to get the NeXTstep 2.0 operating system completed. Originally, the project was called "Warp 9," because that was how fast the NeXT development team had to get it out. As the summer of 1990 progressed, the Back Bay group received a variety of NeXTstep prereleases: Warp 2, Warp 3, Warp 3i, and finally Magenta. "Not only was it a new version; it had a new numbering scheme!" exclaims Kleppner.

Other changes–as well as bugs introduced in intermediate releases–were far more serious. One bug in the memory allocation scheme caused the malloc() function–and all of Improv–to run incredibly slowly. Another bug with the Mail application prevented people from sending documents.

Then, a few weeks before the rollout of the new NeXT machines, the NeXTstep text object changed completely–a real problem for Improv's Presentation Builder. "We had spent a fair amount of time optimizing the old one," says Olsen. Days before the announcement, nobody knew if Improv's graphs would have text on them or not.

By introduction day, they did.

During the following months, the newly named Improv group shipped out their beta release of the program. The final version started shipping in February 1991.

Once again, Steve Jobs sent flowers to the developers. Only this time, it was truckloads. A dozen large bouquets came, along with many small ones. "There was one bouquet that was five feet tall–the size of a short doc writer," says Urgotis.

"It's not the typical Lotus, where we sit in our ivory tower and run ads. We need the feedback."

What's next?

Probably the most-asked question about Improv is whether Lotus plans to develop versions for other platforms.

"We are all mindful of the higher revenue opportunities in the [Microsoft] Windows environment," says King, hinting that the development group is already fairly far along the preliminary design stages of the project.

But designing a user interface with Windows development tools is a problem, says King. "There is no doubt in my mind that if we had started to do Improv on Windows, we wouldn't be as far along as we are now. NeXTstep is the most productive development environment for graphical applications, bar none."

Meanwhile, the Improv group is willing to talk only about support of the existing NeXT product. Foremost on the agenda is listening to users' reactions. Lotus has set up a hotline for direct user input, something that is very unusual for Lotus. The company also produces a user newsletter and is conducting extensive interviews to find out what users like about the program and what they want changed.

"It's not the typical Lotus, where we sit in our ivory tower and run ads," says Anderholm. "We need the feedback."

Already, users have made it very clear that Improv needs macros and an Undo capability. But more than that, says Anderholm, "We have to figure out what we can add to the product to help people learn it, because you have to unlearn what you know about conventional spreadsheets like Excel and 1-2-3.

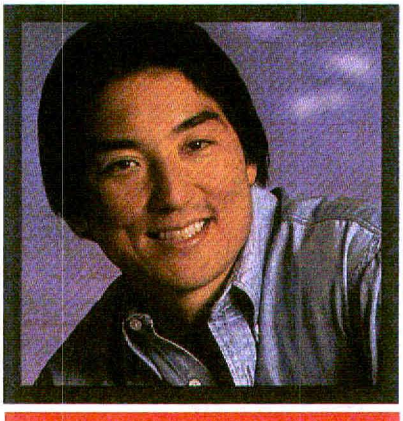
"Our challenge is to convince people that the benefits of this new spreadsheet are worth the cost of switching."

SIMSON L. GARFINKEL
is a Senior Editor at NeXTWORLD.

SIMSON00000735

Déjà Vu

GUY KAWASAKI



"NeXT Computer. This is Ellen."

"Hi. I'm a Macintosh developer, and I'd like to get information about writing software for the NeXT."

"Okay, one moment please."

"Hello. This is Susan."

"Can I get information about writing software for the NeXT? I'm currently a Macintosh developer."

"The first step is for you to fill out an application to become a certified developer for us, and I'd be happy to send you an application."

Elapsed time: 45 seconds. Already, I knew I was in trouble. *NeXTWORLD* had asked me to write a column about NeXT's efforts to evangelize third-party software and hardware developers, and I was set to write a scathing report about NeXT's arrogant, unresponsive, yellow-tie evangelists (NeXT calls them "advocates") who wouldn't be able to evangelize Christianity if they'd seen the resurrection.

This preconception was a misconception. I found, much to my disappointment, that NeXT evangelism is among the best in the computer industry. In fact, much of NeXT's evangelism is reminiscent of the heyday of Macintosh evangelism in 1984 and 1985. I'm a pragmatist: If you can't criticize someone, you might as well claim that they're as good as you were.

NeXT evangelism starts at the top–or near the top. The person in charge of developer programs at NeXT is a vice president who reports to Steve himself. This is a big deal because it shows that developers are as important to NeXT as R&D, sales, and finance. (This isn't reminiscent for me. The highest I could get at Apple was a director–and then only if Jim Manzi, Ed Esber, and Bill Gates approved.)

In evangelism as in sex, position and size aren't the key. What counts is performance, and NeXT's evangelists are exemplary. Here's why.

First, the evangelists really believe what they are saying. I had a role-playing session in which two evangelists tried to convince me to do NeXT software. I said, "You're only selling 3000 units a month. Macintoshes are selling 100,000 per month. How can I make money doing a NeXT product?"

They said: "NeXT is the direction for the future of computing. We represent a growing marketplace when other manufacturers are flat. You can be on the leading edge of computing, which will help you with your products on the other platforms. Though we have smaller run rates, you can penetrate more of the market because there is less noise."

It doesn't matter whether these reasons are true or not. Good developers want to write software for a computer before it's rational anyway, and all they want to hear is reinforcement of their unfounded decision. The most important thing is that evangelists believe their own crap, and that NeXT evangelists certainly do. (To tell you the truth, Macintosh evangelism succeeded because we were too dumb and naive to know that it shouldn't.)

Second, the evangelists know how to use reality distortion. The evangelists told me that NeXT has a 50 percent market share of the "professional workstation" market. You've got to love this malarkey: define a new market by subtracting the (Sun) workstations sold for engineering and scientific uses, so that you can claim an impressive market share. (The Japanese have a saying: "If you can't make the numerator larger, make the denominator smarrer.") Why, if NeXT defined a market for professional workstations with black cases, they could claim 100 percent market share.

Third, the evangelists have the right attitude: "Ask forgiveness, not permission." That is, they will do special things for developers, such as sliding them loaner equipment, giving them free passes to developer training, and paying expenses for them to visit NeXT. These kinds of actions, though they seem inconsequential, foster loyalty to a company.

Talk is cheap, so I asked the evangelists for references. In real time, the NeXT evangelists rattled off three developers and their phone numbers. (The fact that they had the phone numbers memorized is significant.) These references checked out, although I wonder what would have happened if I had called other developers.

Fourth, the evangelists know how to play their cards. It's common for evangelists to get NeXT's engineers and managers to meet with developers to hear their concerns, and to offer technical advice. I asked, hypothetically, if Steve (the ace in the deck) would come to my NeXT product announcement. The answer was an immediate "Yes." To a developer, this is the equivalent of the Pope agreeing to baptize your child–before it is born.

Finally, NeXT has created effective developer programs and tools, including a developer training course that's run twice a month in California, once a month in Pittsburgh, and once a month in Europe; a ten-volume documentation guide to writing NeXT software; and on-line bulletin board support. It's not only informative, it's also reassuring to developers that such programs and tools exist.

Okay, I hear you saying, "If NeXT evangelism is so good, why is there so little software?" I've been in this position before, so let me explain. First, it always takes two to three years to get software. Always. Nothing can change this. Second, from the time a computer has great software, it takes another year for the industry to recognize this.

Third, NeXT's evangelism wasn't always this good. NeXT initially had the misguided belief that it was a privilege and an honor to do NeXT software. It's funny how a few bad quarters change one's perspective.

Here's the bottom line: Around the time that Sun's engineering and scientific markets have dried up and Microsoft has sucked the marrow out of Silicon Graphics's bones, there will be a broad selection of productivity software for NeXT. Then, largely because of evangelism, NeXT will eclipse Sun as the dominant workstation manufacturer.

There's one more reason. Medicine will cure death and government will repeal taxes before Steve will fail. You can quote me.

GUY KAWASAKI, *former director of software product management at Apple Computer, was responsible for the relationship between Apple and its developers. His new book,* Selling the Dream *(Harper Collins), explains how to evangelize products, companies, and ideas.*

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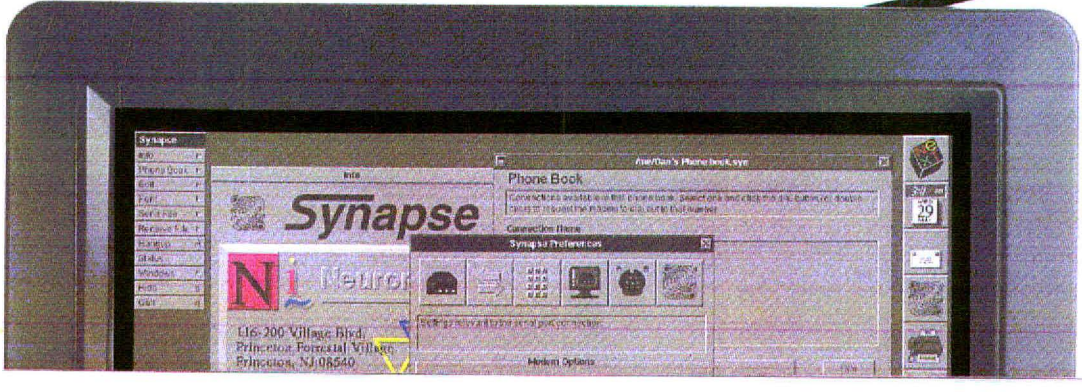


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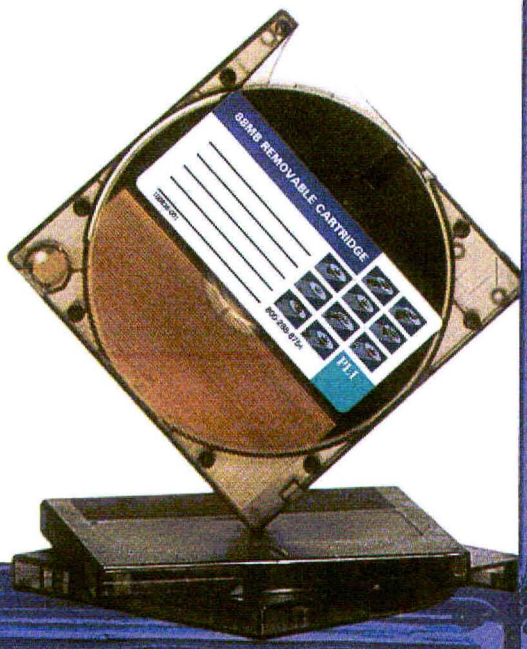
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